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Analysis of factors affecting the development of an emerging capital market: The case of the Ghana stock market

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Abstract

The study looks at the institutional factors affecting the development of the Ghana stock market. Additionally, the study analyses the impact of the listing of Ashanti Goldfields corporation on the development of the Ghana stock market.

The study establishes that the institutional factors particularly the legal and regulatory framework that ensure the protection and security of investors are in place, and that the call-over system of transactions is very transparent.

The study also finds that the delivery and settlement of transactions are performed satisfactorily by brokers, however the introduction of a centralized clearing system would significantly improve upon the clearing and settlement procedures. The study further establishes that the entry into and exit from the GSE are without any significant restrictions.

Analysis of the structure of the GSE shows among others that many of the local investors can be described as low income investors. A sizeable percentage has no formal education and the knowledge of local investors about the capital market is quite poor. Foreign investors have come from Europe, America, the Far East etc. With the exception of Nigeria, no foreign investors on the GSE have come from sub-Saharan Africa.

Using the law of one price and the random walk test, the study establishes that the GSE is "weak-form" inefficient. Additionally, the study finds that the listing of AGC has had tremendous impact on the GSE in many ways including improving market liquidity and market turnover.

The study recommends a campaign to educate the Ghanaian public about the activities of the GSE and to promote investment in general. There is need for the government to give fiscal incentives in the form of taxation in favour of listed companies, and to pursue prudent macroeconomic policies, particularly in the area of inflation management. A regular review of the legal and regulatory framework within which the investment laws operate is necessary to boost the confidence of investors.

I. Introduction

The role of long-term capital in the economic development of a nation cannot be over emphasized. Most economic managers recognize that a well organized capital market is crucial for mobilizing both domestic and international capital. In many developing countries, however, capital has been a major constraint in economic development.

Dailami and Atkin (1990) describe the provision of funds to finance domestic capital formation as a key factor in the prospects for long-term economic growth in developing countries. The authors observe that the reality of a much reduced supply of foreign funds from previous sources, such as commercial banks, compels governments in many developing countries to pay increased attention to capital market development as a way of improving domestic resource mobilization, enhancing the supply of long-term capital and encouraging the efficient use of existing assets. They contend that the ongoing debt crisis is serving to focus attention on the importance of equity rather than debt, particularly in the financing of risky projects with long gestation periods.

As Pardy (1992) observes, securities markets have an important role to play in financial liberalization and deepening. The author contends that apart from providing a means of diversifying risk for both capital raisers and investors, securities markets could play other roles. For example, they are a mechanism for capital allocation and corporate monitoring, and a means for government to exercise market-based rather than direct fiscal and monetary policies.

Demirgüç-Kunt (1992) observes that in the poorest developing countries, firms rely mostly on internal resources and informal credit markets for financing. Commercial banks are the main financial institutions. The author contends that the loan contracts of commercial banks are generally short term, and formal direct credit markets for long-term debt or equity do not exist, thereby constraining both corporate and economic growth.

Engberg (1975) recognizes the need for capital markets even for less-developed economies. He contends that capital markets can significantly raise the level of domestic savings and contribute to a more efficient allocation of such savings among competing uses. The author emphasizes that through the capital market, a variety of financial assets, carrying different risks, yields and liquidity, is added to the traditional types of financial assets such as demand and savings deposits.

He further observes that the availability of this wider range of financial assets will induce people to increase their rate of current savings. The reason is that the capital market enables savers to achieve a better wealth composition and also permits adjustments to be made in the wealth composition with speed and at low cost whenever circumstances change. Moreover, competition among the users of capital market funds, including

business, government and individuals, will tend to increase the efficiency with which capital is used, with direct effect on the growth rate of the economy.

In Ghana, the capital market has not yet played its role in capital mobilization, though if properly organized it could be a source of the much needed capital necessary for economic growth. The main sources of capital for the country’s economic development are donors, and these have leveled off at about 9% of GDP over the last several years. Additional supply of capital is urgently required to maintain the momentum of the growth in GDP.

Also in Ghana, an organized capital market can serve as a medium for transferring part of the business ownership of foreign corporations to the citizens. The market could, moreover, be used to transfer the ownership of about 300 state owned enterprises through the government’s privatization exercise and thereby improve efficiency as well as increase public ownership in them.

Central to the efficient functioning of a capital market is the development of the stock market. The emerging capital markets of Southeast Asia have successfully used the stock market to mobilize huge savings and channelled such savings to appropriate investments (see Table 1).

Table 1: Capital mobilization by emerging markets of Asia

	Market capitalization (Billions of US\$)	No of listed firms
India	39	2435
Indonesia	7	116
Korea	111	669
Malaysia	49	282
Philippines	12	163
Thailand	24	214

Source: IFC’s Emerging Markets Data Base 1990.

The Ghana Stock Exchange (GSE) was incorporated in July 1989 as a company limited by guarantee. The need for a stock exchange for Ghana had been considered as far back as 1968; a rudimentary market was set up in 1971 but it experienced a false start. Trading on the GSE actually commenced on 12 November 1990 with 11 listed companies. This number has grown to 18 over the six-year period, a rate of about one company per year. There are no listings on the second and third official lists. The slow pace of listing on the GSE reflects the pace of growth of the capital market of Ghana.

This study attempts to identify and analyse the factors affecting the development of this capital market and to make the necessary recommendations.

II. Literature review

There has been considerable interest in the development of capital markets in many developing countries in the last twenty years or so, and, evidence of the role of financial markets in economic development is well documented. Goldsmith (1969), in a study of 36 countries drawn from both developed and developing countries over the 100-year period 1860-1963, shows evidence of a positive relationship between the ratio of financial institutions' assets to GNP and output per person. Goldsmith presented data showing that (with some exceptions) periods of more rapid growth in the economy have been accompanied by an above average rate of financial development.

Other researchers, including Barro (1989) and Romer (1989), have used cross-country data spanning several years to show very significant differences in per capita output growth rates and financial market development. Levine (1990) shows that stock markets accelerate growth by (1) facilitating the ability to trade ownership of firms without disrupting the productive process occurring within firms, and (2) allowing investors to hold diversified portfolios.

Having seen the important role that capital markets (and for that matter stock markets) can play in the economic development of a nation, we turn our attention to the literature on the factors that may affect the faster development of the capital market of the developing countries.

Demirgüç-Kunt and Levine (1993) indicate traits of characteristics of stock market development as (1) *traditional characteristics*, which include market capitalization, the amount of new capital raised through stock offerings, the number of listed companies and turnover; (2) *institutional characteristics*, which include regulations, information disclosure, transparency rules and trading costs; and (3) *asset pricing characteristics*, which is the efficiency with which the market prices risk and the degree of integration into world stock markets.

Pardy (1992) contends that there are two basic building blocks necessary for a thriving securities market: (1) a *macroeconomic* and *fiscal* environment conducive to the supply of good quality securities and sufficient demand for them; and (2) a *market infrastructure* capable of supporting efficient operation of the securities market. Under the first precondition, the author indicates that the demand for and supply of securities is crucially linked to the state of the macroeconomy. If the macroeconomy is conducive to profitable business operation, a sufficient number of sound businesses can develop to a stage where access to securities markets is useful for their continued growth. This means that if there are not sufficient profitable businesses with good prospects for the future, there is little reason to have a securities market.

The second precondition, i.e., the market infrastructure that will make the securities market operate in an efficient, fair and stable manner, is broken into three:

1. The ***institutional infrastructure***, which provides the operational basis for the market, relates to intermediaries that provide trading, investment management and financial advisory services; market and market-related service providers for stock exchanges, over-the-counter markets, market information services, transaction clearance and settlement systems, and securities transfer, registration and custody; and providers of ancillary services such as accounting and auditing, legal advice, and financial valuation and debt rating services.
2. The ***regulatory infrastructure*** relates not only to the government body that has the power and responsibility to supervise the market, but also includes self-regulatory organizations such as stock exchanges, accounting standards boards, and accounting and auditing professional associations and similar organizations. It also includes their rules and regulations, procedures, and facilities such as stock exchange listing and trading rules or accounting and auditing standards, plus the monitoring and enforcement of these rules.
3. The ***legal infrastructure*** provides the basis for the operational and regulatory framework. It provides for property rights, contractual relationships, forms of incorporation, and rights and responsibilities of participants in the market. It also specifies the powers and responsibilities of the government supervisory authority and self-regulatory organizations.

The first precondition for sound securities market development put forward by Pardy recognizes the importance of taxation (fiscal environment). The author finds that differential effective tax rates on either income or capital gains from different financial instruments will distort capital raising and investment decisions. Pardy supports this conclusion by observing that quite a number of developing countries with state ownership of commercial banks have tax rates that discriminate in favour of savings and demand deposits as opposed to securities investment, and in favour of borrowing from banks as opposed to raising capital from the public. For capital market development, these taxation differentials must be removed.

Demirgüç-Kunt and Huizinga's (1992) study has implications for the design of tax policy related to foreign portfolio investment in developing countries. They indicate that the existence of foreign tax credits for dividend taxes paid suggests that a country should tax capital gains lightly in comparison with repatriated dividends.

Lyon (1992) finds that differing tax treatment of equity and debt can create divergent costs in the use of retained earnings, new share issues and debt finance.

In the literature, another factor that affects the development of the capital market is information disclosure or transparency of transaction. Versluysen (1988) indicates that in markets for publicly offered securities, investor access to information pertaining to their prospective investments is more limited than that of professional intermediaries. Investors can therefore be protected by the compulsory disclosure of financial data and other relevant information relating to the issues of securities.

Pardy (1992) also contends that a company that raises funds from the public must be required to disclose sufficient information to allow an educated investor to make a reasoned investment decision so that the aggregate of investors' decisions may be a good assessment of a company's worth. This requires an effective legal infrastructure to specify and enforce disclosure standards for all companies issuing securities for the public. Those companies that have securities listed for secondary trading on a market such as a stock exchange should be subjected to additional disclosure requirements imposed as listing rules.

Chuppe and Atkin (1992) contend that information asymmetries abound in financial markets. The managers of a firm know more about that firm's market prospects and investment opportunities than do outsiders. Financial market professionals often have access to information that is not widely available. In an unregulated market, the possibility exists that unsuspecting investors will be harmed by those with access to information not available to the public at large. This is important for the economy because lack of public confidence in securities markets would cause the supply of funds to the markets to dry up, thus depriving the economy of the benefits of a functioning market.

The authors further observe that these information asymmetries are the basic justification for a large number of regulations. Disclosure requirements for public companies must ensure that financial information is available for investors in a way that facilitates inter-company comparisons. It must be noted, however, that disclosure is only effective if there are good accounting standards in place, standards that allow investors to assess the financial health of enterprises.

A study by Cheung and Krinsky (1994) confirms underpricing by investment bankers in an environment of information asymmetry.

The literature summarized above shows that many factors may affect the development of capital markets in the developing countries. Identifying the negative factors for rectification will therefore quicken capital market development.

III. The problem and the need for the study

Many factors affect the development of the capital market. The capital market consists of the primary and the secondary markets. The primary market is the one in which underwriters help companies raise capital in the form of initial public offerings or by issuing seasoned stocks and bonds to investors. The secondary market is the one in which shareholders can resell their shares to other interested buyers on the stock exchange or the over-the-counter market. Many factors affect the development of both the primary and the secondary markets.

There is abundant evidence that most Ghanaian businesses lack long-term capital. The business sector has depended mainly on short-term financing such as overdrafts to finance even long-term capital. Based on the maturity matching concept, such financing is risky. All such firms need to raise an appropriate mix of short- and long-term capital. There are about 300 state-owned enterprises in diverse business areas to be privatized. The need for a quicker development of a well organized and functioning capital market has become extremely important. In the light of these developments, it is necessary to identify and analyse all the negative factors that impinge on the development of the capital market in Ghana, especially the stock market, and to make the necessary policy recommendations to rectify the situation sooner than later.

IV. Objectives of the study

The main objective of this study is to analyse the institutional (including regulatory and legal) factors that affect the development of the Ghana Stock Exchange.

Other objectives are:

- To assess the efficiency of the Ghana Stock Exchange by
 - testing for the law of one price using the Ashanti Goldfields Corporation (AGC), which has simultaneous listing on the London Stock Exchange (LSE) and the Ghana Stock Exchange.
 - testing the random-walk hypothesis
- To analyse the impact of the listing of AGC on the development of the Ghana Stock Exchange.
- To make policy recommendations that will promote effective development of Ghana's capital market.

V. Methodology and results

We analyse the effect of the institutional factors on the development of the GSE by examining the following institutional characteristics:

- The legal and regulatory framework
- Information disclosure requirements
- Transparency of transactions
- Accounting and auditing standards
- Transaction costs
- Delivery and settlement
- Barriers to entry and exit
- Taxation of investment income
- Market structure
- Public knowledge of securities markets

The legal and regulatory frameworks

In order to ensure orderly and equitable dealings in securities, as well as the protection and security of investors, all capital markets especially the emerging ones operate within a framework of laws and regulations enacted by the country. The extent to which these laws are enforced will have a direct bearing on the development of the stock market.

In Ghana, the various laws enacted in connection with the securities market include the Securities Industry Law (SIL) 1993 (PNDCL 333). This law mainly spells out the establishment of the Securities Regulatory Commission and how the commission should function. Two provisions for regulating transactions on the exchange as well as membership of the exchange are the Ghana Stock Exchange Listing Regulation 1990 LI 1509 and the Ghana Stock Exchange Membership Regulations 1990 LI 1510. The establishment of the Securities Regulatory Commission (SRC), whose function is to maintain surveillance over the securities market, is to ensure fair and equitable dealings in securities. SRC has the authority to license stock exchanges, unit trusts, mutual funds, and securities dealers and investment advisers. It is also responsible for protecting the securities market against abuses such as insider trading practices. Takeovers, mergers and acquisition of companies are subject to the review, approval and regulation of the commission.

Other laws that protect the securities market directly or indirectly include the Companies Code of 1963 (Act 179), the Bank of Ghana Act, 1963 (Act 182), the Banking

Law of 1989 (PNDCL 225) and the Financial Institutions (Non-Banking) Law, 1993 PNDCL 328. This list of laws and regulations indicates that the legal and regulatory framework of the securities market and for that matter the stock market is adequately taken care of compared with those of even industrialized nations.

Moreover, the study found evidence of the enforcement of the regulations. A notable case was the suspension and the imposition of fines against three brokerage firms, Databank Brokerage Limited, EBG Stock Brokers and SDC Brokerage, Ltd., in early December 1995 for contravening the rules governing the operations of the financial market.

Databank Ltd was suspended from dealing on the floor of the GSE for a number of trading days, while the memberships of EBG Stock Brokers and SDC Brokerage, Ltd., in the council of the GSE were terminated.¹ (See Appendix A.)

Information disclosure requirements

Public disclosure of relevant information about securities is important for both pricing efficiency and market confidence. If investors are to make sound judgements about the value of securities, they must be fully informed of relevant facts.

The study found that the disclosure policies governing listed companies on the Ghana Stock Exchange, as enshrined in Legislative Instrument (LI) 1509, are quite comprehensive. Various regulations under this legislative instrument touch on information to be disclosed to the general public.

For example, Regulation 55 requires that every listed company make available to the public information necessary for informed investing, and that listed firms take reasonable steps to ensure that all who invest in the company's securities enjoy equal access to such information. Regulation 56 requires a listed company to make immediate public disclosure of all material information concerning its affairs, except in exceptional circumstances. A listed company is also required to release material information to the public in a manner designed to obtain its fullest possible public dissemination. Regulation 57 requires that if listed companies become aware of a rumour or report, which may be true or false, that contains information that is likely to have or has had effect on the trading of the company's securities or might have a bearing on investment decisions, the company is required to publicly clarify the rumour or reports as promptly as possible.

Information disclosure on financial reports is well covered in Regulations 43 and 44. Regulation 43 binds listed companies to give to the exchange a half-yearly report as soon as figures are available and in any event not later than six months after the end of the first half-yearly period in the financial year. Under Regulation 44, listed companies are expected to give to the exchange a preliminary annual financial statement as soon as figures are available and in any event not later than three months after the end of the financial year. Information to be disclosed in both half-year and annual financial statements includes turnover, consolidated operating profit/loss, income from associated companies, extraordinary items, minority interests, operating profit as percentage of turnover, operating profit as percentage of issued capital and reserves at end of year, earnings in

cedis per ordinary share and dividends, including amount per share, date payable etc.

For firms wanting to list on the exchange, the information disclosure requirements are that the company must provide the background of the company, especially the history, the line of business, the capitalization, the distribution of shares such as authorized and issued capital, and the distribution of shareholders. Other information such as dividend records, fiscal year end, date of annual meetings and any pending legal actions must all be disclosed.

The study found through interviews of the officials of the Ghana Stock Exchange and the stockbrokers that to a large extent all the information disclosure requirements are being enforced by the GSE.

Transparency of transactions

Transparency of trading and other procedures allows efficient price setting and confidence in the fairness of the market. Fragmented or privately conducted trading with limited disclosure of quantity and price means that each new transaction in effect must be based on relatively expensive search costs and there is a risk of the transaction going out of line with prevailing prices. Opaque trading procedures engender suspicion of market manipulation and may reduce the rate of investment.

On the GSE, all buying and selling of shares are done through brokers or licensed dealing members (LDMs) who have the license to buy and sell shares on behalf of their clients on the exchange.

The study found that the call-over system of trading on the GSE is quite transparent as trading is opened to members of the public. There is therefore transparency of pricing. To further demonstrate transparency, brokers fill in a bargain slip in triplicate. One copy is for the stock exchange, and one copy goes to each of the brokers making the transaction. This slip has information on price, quantity and the security involved. It may be interesting to note that all brokers interviewed felt strongly that there is transparency in trading on the GSE. Despite these measures, however, one cannot rule out collusion between brokers in price establishment, although there is no evidence of such practice.

To further assure public confidence in trading on the GSE, a surveillance unit to monitor compliance by all parties involved in trading is in place at the GSE. It has been realized that this department needs to expand in the near future, as the surveillance duties are currently performed only by the general manager who already has a busy schedule.

Accounting and auditing standards

Users of accounting information include the government, the regulatory agencies, the financial community, professional organizations, chartered accountants and accounting firms, the investing public, industry association, and the general public.

These users may have both coinciding and conflicting needs for the various types of financial statements and reports. In meeting these needs, accountants and auditors prepare

a single set of general purpose financial statements and reports that present objective, unambiguous and complete economic facts of the existence and operations of the enterprise. In order to narrow the areas of differences and minimize the dangers of bias, misinterpretation, inexactness and ambiguity, accountants and auditors have adopted generally accepted accounting and auditing principles or standards. These standards allow financial statements and reports to be reasonably compared between enterprises and between accounting periods.

The Council of the Institute of Chartered Accountants of Ghana adopts the Statements of Accounting Standards of the International Federation of Accountants (IFAC). Since accounts of listed companies are prepared by reputable firms, accounts submitted to the GSE can be expected to be of internationally acceptable accounting and auditing standards. Interviews with officials of GSE confirm that this is the case.

Transaction costs

Unreasonably high costs of transactions will affect market development since investors aim at minimizing cost to increase their returns. For companies going public through share issue and subsequently seeking listing on the exchange, the main costs are:

- underwriting fee
- legal and accounting expenses
- brokerage commissions
- cost of printing and advertising prospectus
- fees for the GSE (including listing fees, application fees, and annual fees)

For individuals buying and selling shares on the stock exchange, the main cost is brokerage commissions.

A latent cost is the interest forgone when payment is made to the broker while the investor waits, sometimes for a couple of weeks or more, before the stock is purchased.

The study found that for firms going public, the cost of going public as percentage of capital raised decreased as more capital is raised. It is also cheaper to raise capital through private placement than through public issue (see Table 2).

Table 2: Cost of going public

Firm	Capital raised	Expenses incurred	Ratio of exp. to cap.raised	Type of issue
Home finance Co.	¢1312.45 million	¢30.8 million	2.345 %	Private
Ashanti Goldfields ^a	\$62.25 million	\$2.146million	3.45 %	Private
Mechanical Lloyd	¢486 million	¢56.46 million	11.6 %	Public
Super Paper Prod.	¢630 million	¢56.38 million	8.95 %	Public

Source: From the files of the various companies

^a This flotation was carried out in August 1995 on the London Capital Market at a price of \$20.75 per share. Three million shares were successfully floated.

Underwriting fees, legal and accounting expenses, cost of printing and advertising,

etc., are negotiable with the firm providing such services, but again they fall with higher capitalization. (See Appendix B for details of flotation costs for Home Finance Co., Mechanical Lloyd Co., and Super Paper Product Co.) Brokerage commissions as set by the GSE range from ₺800 for minimum purchases to 1% (of value purchased) for values over ₺10 million (see Appendix C). Application fees, listing fees and annual fees payable to the GSE range between .003% and 2.42%, depending on the amount of capital to be raised (see Appendix D).

Another source of cost that may be encountered in initial public offering is underpricing; this cost estimation was beyond this study, however.

It was interesting to note that no brokerage firm dealing on the GSE paid any interest on client funds deposited with them while the clients waited for the purchase of shares by brokers on their behalf. This means that if clients wait for as long as one month before their shares are purchased, they earn no interest on the funds deposited with the broker. Interestingly, almost all the brokerage firms manage funds. There is therefore no reason why these brokerage firms should not pay interest on clients' unused funds.

Based on the current treasury bill rate of about 45%, investors lose as much as 0.125% per day of their unused funds with brokers. It is expected that this practice would affect the development of the stock market, especially as clients become aware that brokerage houses invest such funds in short-term investments such as overnight money markets, treasury bills, etc.

Delivery and settlement

Under delivery and settlement, the study was interested in transactional clearance and settlement systems, securities transfer, registration, and custody. In some emerging capital markets, investors in securities have expressed concern about purchasing securities but not receiving either their certificates or their dividends. In other situations, investors who have sold their securities continue to receive dividends. This obviously shows poor securities transfer, registration and custody.

The study established that in delivery and settlement on the GSE, the original certificates are surrendered while transfer forms with standard information are transferred to the other party. Delivery and settlement is to be completed within 14 days as stipulated by the exchange. The study found that the 14-day delivery and settlement deadline was strictly adhered to. The study also found that the regulation requiring brokers to send transactions results to their clients within 48 hours was adhered to. This was easily checked by the GSE because each broker filed returns on payment of levies and commission by their clients with the GSE.

The study found that the licensed dealing members were in favour of a centralized delivery and settlement system. It was also learned that the GSE is planning to introduce a centralized manual clearing system in the near future.

Barriers to entry and exit

Excessive barriers especially to foreign investors hamper the development of any stock exchange. Purchasing of shares on the Ghana Stock Exchange has been described as without any significant restrictions by the International Finance Corporation (IFC) (see IFC 1995 Factbook). For comparison of entry and exit barriers of the GSE with other emerging capital markets see Appendix E.

Generally all listed stocks are freely available to foreign investors. However, any one external resident portfolio investor whether individual or institutional can hold only up to 10% of any security approved for listing. Further, the GSE requires that the total holdings of all external residents in one listed security should not exceed 74%. Ghanaians resident outside Ghana and foreigners resident in Ghana may invest without any limit.

There is free and full foreign exchange remittability for dividends, interest and capital gains. Initial capital invested may also be remitted without any restrictions. The analysis indicates that there are virtually no barriers of entry to or exit from the GSE. It seems therefore that barriers to entry and exit are not an important factor in the development of the GSE, since investors can move in and out of the market without any restrictions.

Taxation of investment income

In the classical Modigliani-Miller concept of perfect capital markets, financing decisions made by firms are irrelevant. Firms are indifferent between drawing on retained earnings, issuing new shares or issuing debt. However, in an imperfect financial market like Ghana's, one of the factors that influences firms' choice of financing is the taxation of income.

Differences in effective tax rates on income from different financial instruments can influence how individuals or corporate bodies make their financial and investment decisions. Such differences may also determine whether an individual should invest in securities or demand deposits or whether a corporate body should raise funds through equity or debt instruments.

Ghana's withholding taxes on investment income are shown in Table 3.

Table 3: Withholding taxes on investment income in Ghana

	Interest income	Dividend income	Capital gains
Individual	0%	10%	0%
Corporate	10%	10%	0%

Source: Survey data.

Individuals in Ghana investing in debt securities do not pay any taxes on interest from such investment. However, a tax of 10% is deducted on dividend income from investment in equities. Capital gains are not taxed. For corporate bodies, dividend income and interest income are taxed at 10%, while capital gains are tax-free. It is worth noting that interest expense for corporate bodies is tax deductible.

These figures show that at the individual level, debt instruments have an advantage over equity instruments since interest incomes are not taxed. At the corporate level, incomes from debt and equity instruments are taxed at par at 10%. However, firms raising capital by issuing debt instruments may deduct their interest payments as allowable business expense. This makes debt capital relatively cheaper than equity capital at the corporate level on the Ghana capital market. Combined with the high cost of raising equity capital from the capital market, this may explain partially why many firms resort to short-term borrowings (such as overdraft) on the financial markets of Ghana. (See Appendix F for a comparison of withholding taxes for emerging markets.)

Investor profile

The study examined the composition of market participants, including individuals and institutions both domestic and foreign. The volume of transactions of each group and the social standing of individual investors were also analysed.

For this purpose, questionnaires were sent to 6 of the 11 brokerage houses. The six selected were the first brokerage houses to be established and account for about 80% of the brokerage services in Ghana. The questionnaires were completed by the appropriate officials of the brokerage houses after an initial briefing of the required information. (See Appendix G for sample questionnaire.)

The analysis of the questionnaire responses by the brokers is presented below under various subheadings. Results are as at November 1995.

Local versus foreign investment value

The ratio of local versus foreign investors in terms of value of investments on the GSE is as shown in Table 4.

Table 4: Proportion of local and foreign investment in Ghana Stock Exchange

Type of investor	Value of investment
Local investors	57%
Foreign investors	43%

Source: Survey data

The results indicate that foreign investors play quite a significant role on the GSE. The ratio of the value of investment by foreigners to local investors is about 2:3. The results are interesting in the sense that whereas the number of local investors may be many times the number of foreign investors, the foreign investors come in with more investible funds compared with the local investors. This observation correlates highly with the income level of the local people compared with the income level of the countries where the foreign investors have come from (see section below on foreign investors).

Local individual versus institutional investment

The analysis of questionnaire responses showed that in terms of value, local individual investors hold the same value of investments as do institutions (Table 5). On the other hand, local institutions are not active in share trading compared with the individuals. The institutions rarely go to the market to trade. This finding may be attributed to the thin volume of share trading on the GSE. Institutional demand for shares is usually far higher than the individual investor demand for shares. This means that institutions can only be very active when trading volumes increase substantially.

Table 5: Individual and institutional investment in GSE

Type of investment	% of investment
Local individual investment	50
Local institutional investment	50

Source: Survey data.

Profession of local individual investors

Table 6 shows that farmers and artisans (including carpenters, masons, electricians, etc.) do not play a significant role in investment on the GSE. This result is probably to be expected. Most farmers and artisans are illiterate and may not even know about the existence and working mechanisms of the stock market. The low figure perhaps reflects the few educated ones among them.

Table 6: Profession of investors in GSE

Profession of investors in GSE	% of investment
Farmers	2.8
Artisans (carpenters, masons, electricians, etc.)	5.0
Small business owners, (storekeepers, retailers, etc.)	34.2
Office clerks, teachers, etc.	15.0
Middle managers	18.8
Chief executives	11.7
Pensioners	12.5

Source: Survey data.

Although small business owners may not be highly educated, they tend to have extra funds for investment. If these business owners could be educated through workshops, seminars, etc., they could even play more active role in investment on the GSE.

Teachers, clerks, etc., form the bulk of employees of the country but they are among the most poorly paid. Therefore despite the large size of the group, their aggregate investment in shares is minimal. The investment value of middle managers may be expected. The number of middle managers in the work force is quite small but they are

well paid and well educated. Most of them understand how the stock market works and therefore invest part of their funds in it. The size of their investment is quite significant. The number of chief executives is comparatively much smaller but they are the most well paid. Their role here therefore is not unexpected.

The role of pensioners seems interesting and significant. One would have expected them to play a less significant role since they are not in active work service. It is speculated that these pensioners may avoid speculative stocks and invest more in income earning stocks.

Age profile of local investors on the GSE

According to the brokerage firms, investors fall into the age categories shown in Table 7.

Table 7: Age of GSE investors

Age	% of investment on GSE
Above 50 years	23.8
Middle aged, 36-49 years	45.0
Young adults, 25-35 years	26.2
Young people, 18-24 years	5.5

Source: Survey data.

In interpreting the figures in Table 7, we recognize that most young people are unemployed. They may be in school or they may be learning a trade. It is not expected therefore that they will have substantial investment on the GSE. The result above is thus within our expectation.

In the middle age, many individuals have settled down and looking ahead in life, planning for their retirement through investments. The fact that they form the largest investment group on the GSE is not unusual. Young adults are in their early years of employment. They form the bulk of employees. At that age, they are risk loving and may invest more in growth stocks. It is not unusual that they contribute about 26% of the activity on the GSE. The age group above 50 years is likely to invest more in income stocks since they are approaching their retirement age and cannot afford to risk their savings.

Income distribution of local investors

Brokers estimates of their clients' annual incomes are given in Table 8.

Table 8: Income levels of GSE investors

Income group	% distribution
Low income (below ₡1.5 M/annum, i.e., below US\$1,500/annum)	15.9
Middle income (₡1.5M-3M/annum, i.e., \$1,500-\$3,000 per annum)	28.3
Upper middle income (₡3M-5M/annum, i.e., \$3,000-\$5,000 per annum)	28.3
High income (above ₡5M, i.e., above \$5,000 per annum)	27.5

Source: Survey data.

Note: The exchange rate at the time of the survey was ₡1000/US\$.

The low income group has the least activity on the GSE. Although this group is large, individually they do not have much investable funds. The investments of the middle income, upper middle income and high income groups are fairly even at about 28% each. This is an interesting result. Whereas the number of the middle income group may be far larger than the upper middle income and high income groups, members within the middle income and the high income groups earn more and have more investable funds, thus compensating for their lower numbers.

Educational background of local investors

The educational background of investors, as reported by the brokers, is shown in Table 9.

Table 9: Educational background of GSE investors

Educational background of GSE investors	% distribution
No formal education	11.3
Secondary school leavers or equivalent	33.7
Sixth form, technical education or equivalent	31.0
University or equivalent	24.0

Source: Survey data.

One can infer that the ability of many individual investors to make fundamental as well as technical analyses of the market is limited. The need for quality market intermediaries to provide trading, investment, financial and other advisory services to the investors on the GSE cannot be overemphasized. Without this foundation, the GSE may not develop as quickly as expected.

Knowledge about stock markets

According to the brokers, investors' knowledge of the market could be classified as shown in Table 10.

Table 10: GSE investors' knowledge of stock markets

	% of investors
No knowledge	23.3
Fairly good knowledge	59.2
Highly knowledgeable	17.5

Source: Survey data.

The analysis here shows that local investors who are highly knowledgeable about the stock market are lacking. The knowledge of many Ghanaian investors may be described at best as average. More than a fifth of the investors do not have any knowledge at all of

the capital market and how it works. This lack of knowledge definitely will affect the development of Ghana’s capital market. Strong market advisory intermediaries are needed to provide the necessary advisory services for the numerous investors with weak analytical skills (this is to be linked to the educational background of investors on the GSE noted above).

Value of local individual portfolio investment

Table 11 indicates that local individual investors on the GSE may be described as small investors, as about 80% of the individual portfolios are valued at less than \$5,000. This is not unexpected given the low level of incomes of individuals in the country.

Table 11: Value of GSE investment by local individuals

	% composition
Below ₵1 million investment (\$1,000)	18.0
₵1M-2M investment (\$1,001-2,000)	16.2
₵2M-3M investment (\$2,001-3,000)	19.2
₵3M-4M investment (\$3,001-4,000)	24.1
Over ₵5M (above \$5,000)	22.5

Source: Survey data

Numerical portfolio composition of individual local investors

The survey shows that more than 80% of the local individual investors on the GSE spread their investments over more than one company (Table 12). From theory, as the number of investments in a portfolio increases, the unique risk reduces. It is perhaps gratifying to note that 60% of the individual investors have at least four investments in their portfolio given that there are only 18 listed companies on the GSE. We expect the number of investments in individual portfolios to increase as more firms list on the GSE.

Table 12: Numerical composition of individuals’ stock portfolio

	% distribution
One company only	15.0
2-3 companies	25.2
4-5 companies	29.0
6-7 companies	21.0
Over 7 companies	9.0

Local Institutional investment

The number of institutional clients of the major brokerage firms interviewed ranged from 4 to 35, with an average of 14 institutions. As indicated earlier, these institutions

are quite inactive in trading on the GSE. It is expected, however, that as the number of listed firms increases, institutions will take active part in the trading.

Value of local institutional investment

Table 13 indicates that about 80% of the institutional investments are valued at \$20,000 or more. Compared with other emerging capital markets, the value of investments by the institutions is quite low. It is expected that as the market grows, local institutions will increase their investment value on the market.

Table 13: Value of local institutional investment

	% distribution
Below ₦5 million (\$5,000)	7.4
₦6-10 million (\$6,000-10,000)	5.0
₦11-20 million (\$11,000-20,000)	8.6
₦21-50 million (\$21,000-50,000)	14.4
Above ₦50 million (above \$50,000)	64.6

Source: Survey data.

Number composition of local institutional investments

As shown in Table 14, nearly 90% of the local institutions spread their investments among four or more companies listed on the GSE. The institutions reduce unique risk by employing such investment strategy. (Compare with 60% of individual investors having portfolios with four or more companies.)

Table 14: Portfolio composition of local institutional investors

	% distribution
One company	3.8
2-3 companies	7.0
4-5 companies	25.5
6-7 companies	17.5
Over 7 companies	46.2

Source: Survey data.

Foreign investors

All the major brokers interviewed had foreign investors as part of their clientele. These investors were from the United States, the United Kingdom, Turkey, Germany, South Africa and Japan. Others have come from Saudi Arabia, Holland, Canada, Nigeria, France and Switzerland. It is interesting to note that apart from Nigeria, no foreign securities investors came from any sub-Saharan African country to invest on the GSE.

The questionnaire analysis also showed that the listed firms most patronized by the foreign investors in order of popularity were Ashanti Goldfields Corporation, Unilever, Guinness Ghana, Ltd., Stanchart, Pioneer Tobacco Co., Accra Brewery and Kumasi Brewery Ltd. The study did not investigate why these firms are most patronized, but one can speculate that these are firms of multinationals and are therefore known through the parent companies. The case of AGC as the most popular among foreign investors is expected since it has a dual listing on both the London Stock Exchange and the GSE and also because it accounts for almost 90% of the capitalization of the GSE.

Problems of GSE: From brokers' point of view

The survey requested the brokers on the GSE to enumerate their opinions on the problems that needed attention for the development of the Ghana Stock Market. These were listed as:

1. Lack of any effective educational campaign
2. Lack of national awareness
3. Poor patronage in the market/small client base
4. Need for a centralized clearing and settlement system
5. Manual clearing system is slow
6. Poor capitalization of brokerage firms
7. Low number of listed firms
8. Poor performance of most listed firms
7. Stamp duty on foreign investors
8. General economic climate

The concerns expressed by brokers of the GSE echo those of most emerging stock markets, especially those in Africa. There is lack of awareness because there are usually no educational programmes packaged with the establishment of such markets, which are entirely new to the people. There is poor patronage because incomes are quite low for a high percentage of the population.

A centralized clearing and settlement system would not only quicken the settlement process, it would also reduce the cost. The concern of poor capitalization, which was expressed by the non-bank brokerage firms, can be solved by having the brokerage firms go public. It is interesting to note that none of the brokerage firms doing business on the GSE are publicly held companies.

Many emerging markets face a dearth of new listings, according to the brokers. This problem is usually tackled by governments introducing incentives such as lower tax rates, etc., to listed firms.

Public knowledge of securities markets

In an environment like Ghana's, lack of knowledge and unfamiliarity with negotiable instruments by the populace are expected to be significant constraint to the development

of the securities markets. The study found that the short courses the GSE runs on a continuing basis throughout the year are helping to educate the participants about securities. There are five such courses, designed to meet the needs of both professionals and non-professionals on various aspects of the securities industry, that are conducted about every other month. The courses are: Basic Securities, Advanced Securities, Securities Selling and Investment Advice, Securities Trading, and Directors Course. The duration of the courses ranges between 3 and 10 days, usually 3 hours per day.

The basic securities course is for those individuals interested in knowing about the securities market in Ghana. The advanced securities course is a foundation course for securities market professionals, as well as others in law, banking, accounting, insurance, finance and economics, who need an in-depth understanding of the securities markets, instruments, trading, legal issues and analysis of financial statements.

The securities selling and investment advice course is a specified course designed for those seeking licensing as sales representatives and investment advisers. Course four securities trading, which is also a specialized course, is for professionals who want to have an in-depth knowledge of trading on the stock exchange as well as those who intend to seek licensing as authorized dealing officers of stockholding firms.

The directors' course, which has been conducted only once (in 1992) is specially designed for directors of stockbroking firms. This covers the roles and responsibilities of stockbroking firms according to the regulations and laws of the securities industry and the Ghana Stock Exchange.

The efforts of the GSE in this area are commendable. Over the four-year period from 1991 to 1994, 1,682 people have been taken through the five courses (see Appendix H for course participant statistics). It is interesting to note that other African stock exchanges, such as the Lagos, Nairobi, Harare, etc., do not run such courses. The effort of the GSE therefore is unique and will help the faster development of the Ghana stock market. However, in comparison with the level of knowledge of the population, the education of the public through the above program is slow. There is need for other institutions, such as the universities, banks, brokerage houses, etc., to add to the effort of the GSE through similar programmes of education. Only through such collective effort can any educational programmes make any meaningful impact.

VI. Efficiency of the GSE

Market efficiency has perhaps generated more discussion among financial economists than any topic. A market is said to be efficient if it speedily and correctly incorporates information into prices. Market efficiency therefore depends on the ability of traders to devote time and resources to gather and disseminate information. Markets that are more efficient attract more investors, which translates into increased market liquidity.

We analysed the efficiency of the Ghana Stock Exchange under objective two by testing for

- The law of one price (test for arbitrage)
- The random walk hypothesis

The test for the law of one price

On 14 March 1994, the Ashanti Goldfields Corporation floated² shares on both the local and the London primary securities markets at a strike price of \$20 (¢18,700) per share. This share offer closed on 16 and 18 April, respectively, on the local and the international capital markets. In this flotation 22.7 million shares were sold, with 18.8 million shares coming from the government out of its 55% shareholding in the company. The remaining 3.9 million shares came from Lonrho. An additional 1.2 million shares off-loaded by the Ghana government, called the “Ghanaian second round”, were also offered at a price of \$20 (¢18,700) on the local market solely for Ghanaians from 17 May to 24 June 1994. Meanwhile, trading in the shares of AGC commenced on 26 April and 17 May, respectively, on the London Stock Exchange (LSE) and the Ghana Stock Exchange.

At the end of the flotation in June 1994, the AGC share register stood as follows³

London share register	19,503,266 shares
Accra share register	64,396,734 shares
Total	83,900,000 shares

The dual listing of AGC on both the London stock market and the GSE presents an opportunity for testing the law of one price. We expect that if the pricing of AGC on the GSE is efficient there should be no opportunity for arbitrage. That is, the price of AGC on the LSE should be the same as the price on the GSE after considering such costs as brokerage commissions, foreign exchange transfer costs, etc. This test is therefore carried out by comparing the end of day trading quotes of AGC on both the LSE and the GSE

(see Appendix I for the London and Accra closing prices). In this study, tests are carried out using both daily and weekly closing prices. The need for the test on weekly prices is due to lack of price changes on daily basis on the GSE. It is expected that one week (there are three trading days in a week) is long enough to observe some price movements in shares on the market.

Thus, using the traditional parity relationship test in the foreign exchange market, we state that,

P_t	=	$\alpha + \beta(e_t P_t^*) + u_t$
where P_t	=	AGC closing share price on day t on the Ghana Stock Exchange expressed in cedis
P_t^*	=	AGC closing share price on day t on the LSE in pounds sterling
e_t	=	market exchange rate (bureau rate) on day t expressed as cedis/pound sterling
α	=	the intercept
β	=	parameter
u_t	=	error term

We hypothesize that, $\alpha = 0, \beta = 1$

The random walk test for weak-form efficiency

A market in which prices always “fully reflect” available information is said to be “efficient”. Our analysis of the efficiency of the GSE is based on the efficient markets hypothesis (EMH). This hypothesis states that markets always adjust instantaneously to take account of all available information, so no individual analyst has more information than the information that is already reflected in the security’s price. The efficient markets hypothesis suggests three categories of efficient markets:

- Weak-form market efficiency in which current share prices fully reflect all information about past share prices.
- Semi-strong form market efficiency, in which share prices also reflect all publicly available information, e.g., company reports and company public profits forecasts.
- Strong form market efficiency, in which share prices also reflect information that is not published (such as the possibility of a technological breakthrough in a company’s research laboratories).

In this study, we test for the weak form efficiency, which is based on the random walk hypothesis. The proposition of the random walk hypothesis is that share prices (or market returns) do not follow any systematic pattern over time but rather follow a random walk. This is to say that the direction of change as well as the size of change in market returns is random and cannot be predicted from past information about the share prices.

The test for random walk is by examining whether market returns⁴ have historically followed a random walk (see Figure 1 for GSE weekly market returns). Thus $R_{t+1} - R_t$ is independent of $R_t - R_{t-1}$. This means that tomorrow’s returns change (and therefore

Figure 1: GSE cumulative market returns

tomorrow's returns) cannot be predicted by looking at today's returns change. (See Appendixes J and K for daily and weekly returns figures calculated from GSE closing prices 1993-1995. Also see note 2.)

The most frequently used test for studying patterns in market returns (stock prices) is the serial correlation test (runs test may also be used). Serial correlation tests measure the correlation between returns in one period and those of the prior period. A positive correlation shows that there are trends in yield movements. A negative correlation indicates a tendency towards reversals in returns movements. Positive or negative results indicate possible existence of potentially profitable trading strategies. A zero correlation means that no trading strategy can yield potential profits. A zero correlation is consistent with the random walk hypothesis.

In this test for efficiency of the GSE, we are interested in the efficiency of the GSE in two periods: the period before the listing of AGC (see trading session 216-350 in Figure 1) and the period after the listing of AGC (beyond trading session 350 in Figure 1). We are interested in the efficiency of the market in the post AGC listing period because there are pricing efficiency gains to be made by the GSE due to the listing of AGC on the LSE. The test is carried out using both daily and weekly market returns figures as found in Appendixes J and K.

Thus, we express the serial correlation test as

$$\begin{aligned} R_t &= \alpha + \beta_1 R_{t-1} + \dots \beta_n R_{t-n} + u_t \\ R_t^* &= \alpha + \beta_1 R_{t-1}^* + \dots \beta_n R_{t-n}^* + u_t \end{aligned}$$

where,

$$\begin{aligned} R_t &= \text{the cumulative GSE market returns before the listing of AGC} \\ R_t^* &= \text{the cumulative GSE market returns after the listing of AGC} \\ t &= 1 \dots 10 \\ u_t &= \text{error term} \end{aligned}$$

The coefficients are expected to be zero according to the random walk test.

VII. Results for the law of one price

Results using daily price quotations (see Appendix I for figures used for regression) are shown below.

Ordinary least squares estimation⁵

Dependent variable is Accra daily price of AGC (AP_d)
220 observations used for estimation from May 1994 to December 1995

Regressor	Coefficient	Standard error	T-ratio
C	24,207	3393.8	7.1329
LP_d	-.0004993	.0382	-.0131
R-sq.	0.9849	F-statistic F(3,214)	4666.6
R-bar-sq.	0.9847	S.E. of regression	325.2670
Residual sum of sq.	2.26E-07	Mean of dep. var.	22373.8
SD of dep. var.	2625.4	Max. of log-likelihood	-1568.4
DW-statistic	2.0123		

The following results are based on weekly data:

Dependent variable is AP_w
81 observations used for estimation from May 1994 to December 1995

Regressor	Coefficient	Standard error	T-ratio
C	18461.7	2623.2	7.0379
LP_w	.1805	.0816	2.2117
R-sq.	0.9483	F-statistic F(3,214)	4666.6
R-bar-sq.	0.9463	S.E. of regression	614.4286
Residual sum of sq.	2.83E+07	Mean of dep. var.	22268.0
SD of dep. var.	2629	Max. of log-likelihood	-617.2785
DW-statistic	1.9709		

The results show that for the daily price quotations of AGC, the intercept α is significantly different from zero, i.e., α is not zero. β , on the other hand, is not significant, i.e., it is not significantly different from zero. The results indicate that the alternative hypothesis is true: α is not equal to zero and β is not equal to 1.

The results of the weekly quotations of AGC on the Accra and London markets also show that the intercept α is not zero and β is not equal to 1 as hypothesized. We therefore conclude that the AGC share price on the London Stock Exchange is not the same as the

Figure 2: UK and Ghana interest rates

AGC trading price on the GSE. The law of one price does not hold for the trading of AGC shares on the London and the Ghana stock exchanges. In effect, the London and the Accra markets are segmented.

The reasons for the departure from the law of one price in the trading of AGC shares on the London and Accra markets may include the following. First, the duration of trading on the two markets is different. Trading on the LSE is from morning to evening, Monday through Friday; thus there is constant updating of information, which is incorporated into the trading. Trading on the GSE, on the other hand, is conducted only on Mondays, Wednesdays and Fridays from 10am to about 11.30am. With the call-over system the effective trading time devoted to trading in the shares of any one company is approximately 5-10 minutes. With such a disparity in trading durations, it appears the information content of the AGC stock at the two different locations cannot be the same.

Second, a look at short-term interest rates shows a marked disparity between UK and Ghana interest rates. While UK has enjoyed consistently lower interest rates, Ghana has had abnormally high interest rates over the observed period (see Figure 2 and Appendix L). With such disparity in interest rates between the two countries, it is not unusual that the price of AGC should be different on the LSE and the GSE. This is because common stocks have interest rate risk, which arises from the fact that the estimated values of the shares on the different markets are the present values of all future cash dividends. Thus when prevailing interest rates are markedly different in the two countries, the stock prices in the two markets are likely to be different since the expected future dividends are discounted with different interest rates in the two markets. The two markets are in effect segmented.

Figure 3: AGC London minus Accra price

While it is admissible that the differential nominal interest rate argument may not be fully persuasive and may be superseded by arbitrage between Accra and London, market efficiency issues make it still quite important in explaining the price difference on the two markets.

Differential taxation on dividends and capital gains is a third source of disparity between prices on the London and the Accra prices of AGC. Whereas dividends and capital gains are taxed at 10% and 0% in Ghana, they are taxed at 25% in the UK. Since dividend income and capital gains are important components of the value and returns of common stocks, different taxation on dividend and capital gains in the two countries could be a source of deviation from the law of one price.

Transaction costs

Interviews with brokers showed that the main transaction costs⁶ in the international trading of AGC shares include brokerage commissions (local and foreign), GSE levy, funds transfer to UK or to Ghana (commission and cable transfer cost), and phone calls and faxes to UK. Based on a minimum trading volume of 100 shares, our analysis shows that the transaction cost in the trading in AGC shares between the Ghana and the UK market is ₵2,650 per share.

Figure 3 plots the difference in AGC share prices on the London and Accra markets over the period May 1994 to December 1995.

The range is from negative ₵1,000 to about positive ₵7,000. Figure 3 also shows that London prices look more attractive than those in Accra. The transaction cost analysis means that any price differential of ₵2,650 or more between London and Accra can create a profitable arbitrage trading. Table 15 appears to confirm the favourable price trends on the London market, as the direction of AGC share transfer is only from the Accra register to the London register. The question at this point is whether the high demand from the London end is purely based on the price differential or shortage of AGC shares on the London market or some other expectations. It is possible that because of lack of activity on the Ghana market, the high demand for the AGC shares on the London market is being met from the supply from the Ghana market.

Table 15: Monthly transfer of AGC shares between the Accra and London registers by shareholders

Period	Accra to London		London to Accra	
	No of applicants	No of shares transferred	No of applicants	No of shares transferred
May 1994	-	-	-	-
June 1994	6	33,410	-	-
July 1994	5	33,517	-	-
August 1994	5	350,004	-	-
Sept. 1994	5	40,514	-	-
October 1994	15	302,903	-	-
November 1994	7	754,510	-	-
December 1994	4	60,000	-	-
January 1995	5	19,135	-	-
February 1995	254	15,060	-	-
March 1995	7	40,000	-	-
April 1995	2	10,000	-	-
May 1995	11	11,365	-	-
June 1995	4	8,127	-	-
July 1995	6	13,500	-	-
August 1995	6	14,153	-	-

Source: Barclays Bank Accra (Registrar of AGC).

Market efficiency

Serial correlation test for efficiency of the GSE before the listing of AGC

The results of the serial correlation test for $k=1$ to 10 for both daily and weekly market returns before the listing of AGC are shown in Table 16. The results indicate that the first-order serial correlations⁷ are highly significant. This means that there was serial dependence among the daily changes in returns on the Ghana Stock Exchange before the listing of AGC. We conclude that the random walk hypothesis does not hold for the GSE.

Table 16: Efficiency test of Ghana Stock Exchange: Serial correlation coefficients

Lag	1	2	3	4	5	6	7	8	9	10
Daily market returns figures before listing of AGC										
	1.1168 ^a	.007128	-.0428	-.0867	.1944	-.3088 ^b	.1236	.0515	-.1160	.0790
	(11.8467)	(.0505)	(-.3026)	(-.6128)	(1.3836)	(-2.1778)	(.8197)	(.3272)	(-.7373)	(.7707)
	R-bar sq.=.9974, DW=1.9951									
Daily market returns figures after listing of AGC										
	1.1280 ^a	-.0802	.0683	-.2761 ^a	.2102 ^b	-.0461	.0193	-.1077	.1880 ^c	-.1115 ^c
	(16.9986)	(-.8051)	(.6866)	(-2.7714)	(2.0767)	(-.4559)	(.1945)	(-1.0833)	(1.9083)	(-1.7114)
	R-bar sq.=.9883, DW= 1.9902									
Weekly market returns figures before listing of AGC										
	1.5295 ^a	-.5338 ^b	-.0348	-.0269	.0350	.1428	-.3727	.3596	-.1696	.1246
	(10.8295)	(-2.0452)	(-.1293)	(-.1005)	(.1376)	(.5689)	(-1.4845)	(1.4690)	(-.7286)	(.9602)
	R-bar-squared = .9963,DW-statistic = 2.1504									
Weekly market returns figures after listing of AGC										
	1.1261 ^a	-.1890	.0469	.0089866	-.0634	.0876	-.0002314	-.2534	.2551	-.0523
	(8.8146)	(-.9961)	(.2491)	(.0478)	(-.3398)	(.4730)	(-.001255)	(-1.3654)	(1.3154)	(-.4058)
	R-bar-sq. = .9516, DW-statistic = 2.0090									

1. Data for first serial correlation are computed GSE cumulative daily market returns. Data used for test before AGC listing are from 1 January 1993 to 13 May 1994. There are 135 observations for the first lag, 134 for the second lag and so on.
2. Data for second serial correlation, i.e., after AGC's listing are from 17 May 1994 to 31 December 1995. There are 245 observations for the first lag, 244 for the second lag and so on.
3. Data for the third and fourth serial correlations are computed weekly market returns figures. Data for test before AGC are from January 1993 to 13 May 1994. There were 67 observations for the first lag, 66 for the second lag and so on. Data for the test after AGC are from 17 May 1994 to December 1995. There were 82 observations for the first lag, 81 for the second and so on.
4. a,b,c denote statistically significant at the 1, 5 and 10% level, respectively.

That is to say that the GSE was not efficient in pricing shares before the listing of AGC.

Serial correlation test after the listing of AGC

The results of the serial correlation test after the listing of AGC $k=1$ to 10 is also shown in Table 16. The daily market returns show that the first order serial correlation is significantly different from zero. The fourth and fifth coefficients are also significant, and for the weekly market returns, again the first order serial correlation is highly significant. The random walk model does not hold. We conclude that the GSE is not efficient even after the listing of AGC. Investors may be trading on impulse rather than on analysed market information.

In trying to explain why the GSE is not efficient, the following questions may be posed: Do traders devote enough time and resources to gather investment information? To what extent can local investors analyse investment information? Do companies divulge enough information for investors compared with those of the industrialized nations?

At this early stage of development of the Ghana stock market, participants are very few and trading volumes are very thin. Many brokerage houses are barely breaking even. One can easily speculate that not much time and resources will be devoted on information gathering and analysis by either brokers or investors. The cost of any elaborate information gathering and processing could be prohibitive.

Another reason the GSE is inefficient could be the poor ability of investors to analyse and interpret investment information. In Ghana the proportion of investors who can actually analyse and make quality investment decisions are few (see questionnaire analysis under market structure). If a market has participants who cannot make quality investment decisions, an inefficient market should be expected.

Although companies are bound by law to divulge all necessary information, the question is are they giving out enough information for investment analysis? Are investors capable of assessing the information they do get? Thus, even if we assume that the listed companies do give information to investors, the question of analysis comes up again. From the foregoing it is not surprising that the GSE is inefficient.

VIII. The impact of the listing of AGC on the GSE

Objective three of the study, pertaining to the impact of AGC on the GSE, is important because of the high market concentration of the GSE due to listing of AGC (capitalization of AGC alone is about 90% of the capitalization of the GSE; see Table 17). Because of the size of AGC and also because of the dual listing of AGC on both the GSE and the LSE, it is expected that AGC will influence such fundamental market attributes as liquidity, efficiency, trading costs and volatility of the GSE — hence the need for this objective. The analysis of impact is based on the traditional indicators (see Demirguc-Kunt and Levine, 1995).

Table 17: Distribution of capitalization of listed firms on GSE

Company	Market capitalization (billions of Cedis)	(% of total MC)
Accra Brewery Ltd	9.24	0.51
AGC	1594.10	88.42
CFAO	2.18	0.12
EIC	3.23	0.18
Fan Milk Ltd	6.78	0.38
GGL	13.63	0.76
KBL	3.60	0.2
MGL	0.81	0.04
MLC	1.26	0.07
MOGL	17.42	0.97
PTC	4.80	0.27
PZ	1.12	0.06
SCB	85.26	4.73
SCOA	1.41	0.08
SPPC	1.85	0.10
UNIL	51.75	2.87
UTC-E	4.39	0.24
Total	1802.82	100.00

Source: Ghana Stock Exchange, August 1994.

The traditional indicators of impact are:

- market capitalization
- value traded
- turnover ratio

- market capitalization/GDP
- value traded/GDP

Other considerations include the removal of 5% trading limits; changes in the number of trading days per week; and changes in the information system on the trading floor.

Market capitalization

Market capitalization, one of the traditional indicators of market development, is used in this study to assess the impact of the listing of AGC on the Ghana Stock Exchange. To do so we define three time periods. First, the period before the flotation of AGC shares, i.e., before mid-March 1994. Second, the period during the flotation of AGC shares, i.e., mid-March to mid-May 1994. Third, the period beyond the listing of AGC shares, i.e., after mid-May 1994. In order to see the influence of AGC in the analysis, the post listing of AGC market capitalization of the GSE does not include the market capitalization of AGC.

Figure 4 shows the market capitalization of the GSE from May 1993, i.e., one year before the listing of AGC, to the end of 1994, i.e., about seven and half months after AGC's listing. It is interesting to note from the graph three distinct periods of market capitalization growth. From May 1993 up to mid-February 1994 there is a gradual growth in market capitalization of the GSE. The period just before the flotation of AGC shares is marked by a sharp increase in market capitalization of the GSE even though no new additional companies were listed on the exchange. The market capitalization grew from about ₵104 billion to ₵240 billion, an increase of about 130% within a period of two months. After the listing of AGC, the market capitalization without AGC's capitalization drops marginally, but stays almost flat from June to December 1994 and beyond. (See also Appendix M.)

The impact of AGC on the GSE is evident from this analysis. The numerous advertisements on the flotation of AGC both within and outside the country had a spillover effect on the GSE. We conclude that the listing of AGC has had tremendous impact on the growth of the market capitalization of the GSE.

Value traded

Value traded is the sum of the number of shares traded multiplied by their prices. This shows the cash value of activity on the market. Value traded is an important indicator of liquidity or ability to buy or sell quickly without substantially moving prices. Figure 5 shows the daily value traded from May 1993 to the end of 1994. (See also Appendix N.) Again in order to observe the influence of AGC, value traded figures for AGC are excluded. From Figure 5, it is evident that the period after the listing of AGC shows more market activity, i.e., generally there are higher traded values. We conclude that the listing of AGC on the GSE has improved the liquidity of the GSE.

Figure 4: GSE market capitalization

Figure 5: Value traded on GSE

Figure 6: Market capitalization/GDP

Figure 7: Value traded/GDP

Turnover ratio

The turnover ratio is defined as the value of total shares traded divided by market capitalization, that is, the value traded per unit market capitalization. This is also a measure of stock market liquidity since it is the ratio of capital being traded to total market capital. (The turnover ratio graph is not shown, but is similar to Figure 5.) Again, the period after the listing of AGC shows higher turnover ratios, indicating more liquidity on the GSE after AGC's listing.

Market capitalization/GDP

Market capitalization/GDP ratio is a measure of stock market size in relation to the total economy. The magnitude of this ratio indicates the ability to mobilize capital and consequently diversify risk.

Figure 6 (also see Appendix O) shows the end of year market capitalization/GDP ratios from 1991 to 1994 (the capitalization of AGC is not included in the 1994 figures). From the figure, the slope for 1994 is much steeper than all the previous years. The market size improved markedly with the listing of AGC in May 1994.

Total value/GDP

Total value/GDP measures the size of the market activity in relation to the total economy. Since this is a ratio of organized trading in equities to national output, it shows the liquidity of the GSE to the total economy. Figure 7 (also see Appendix P) shows the value traded/GDP for the years 1991 to 1994. The values of AGC are excluded for 1994. The graph shows a sharp rise in the ratio for 1994, the year in which AGC was listed, indicating the positive impact of AGC on the development of the GSE. This measure reinforces the market capitalization/GDP measure in the previous section.

Other considerations for measuring AGC impact on GSE

Removal of 5% trading limits

The GSE regulation that share prices were not to vary by more than 5% during any one trading session was scrapped with effect from 23 May 1994. The rule, which had been introduced in October 1991, stipulated that unless there was justification, prices of shares should not change by more than 5% from previous closing price.

The commencement of the trading in AGC shares on 17 May and the removal of the 5% cap on 23 May were not coincidental. With the trading of AGC, which is listed on both the GSE and the LSE, the GSE assumes international dimensions. The continued maintenance of such a cap would mean that the GSE operated under restrictions and

therefore pricing of shares on the GSE are managed. The removal of the 5% cap was a direct consequence of the listing of AGC on the GSE.

Changes in the number of trading days

With effect from the 23 May 1994, the number of trading days on the GSE was increased from two times a week to three times a week. This additional day per week intended to improve the market liquidity. The timing of the increase again coincides with the AGC listing. AGC introduces an international dimension to the GSE and hence increased liquidity is critical.

Hooking of GSE to Reuters

GSE trading results may be accessed on Reuters screens using the codes IZBU, IZBV, IZBW, IZBX and IZBY. The decision to hook the GSE to Reuters was the direct result of the listing of AGC on GSE. With the listing of AGC on both the GSE and the LSE, it is essential that market information especially on AGC is made instantly available around the globe.

Other factors

Although the focus has been on the impact of AGC on the GSE, it is possible that other factors unrelated to the AGC listing may have improved the performance of the GSE in the period under consideration. For example, the exchange's international membership to outside associations such as the Federation Internationale des Bourses Valeurs (FIBV), African Venture Capital Association (AVCA), etc., might have opened the market to more participation in the period.

IX. Summary of results and conclusions

The study investigated the institutional factors impinging on the development of the GSE. The study also tested the weak-form efficiency and the law of one price. Finally, the study looked at how the listing of Ashanti Goldfields Corporation has influenced the development of the Ghana stock market.

The study established that the legal and regulatory infrastructure needed for the securities market in general and the stock market in particular is in place, with laws and regulations necessary to protect investors and the integrity of the GSE. These include the Stock Exchange Membership Regulation 1991, the Stock Exchange Listing Regulation 1990, and the Securities Industry Law (SIL) 1993. The Securities Regulatory Commission (SRC), which is to serve as a watchdog of the securities industry, has also been formed.

Generally all the brokers interviewed were quite satisfied with the transparency of pricing of shares on the GSE. It appeared, however, that the surveillance department of the GSE may need to be expanded as activity increases in the near future.

The study found that the listed firms on the market complied to the information disclosure guidelines set by regulation. For example, financial reports, the amount of dividends declared, ex-dividend dates, etc., were regularly filed with the GSE. However, the ability of many investors to use the information in investment decisions appeared weak. Hence the inability of the market to price the financial assets efficiently.

On transaction cost, as expected, the higher the capital raised by a firm going public, the lower the proportion of cost of flotation to total capital raised. Private placement was also found to be cheaper than public placement for the same amount of capital raised. Investors suffer interest cost on their unused funds because brokers do not pay any interest on clients' unused funds. This practice is expected to have a negative impact on the development of the GSE.

The delivery and settlement of transactions were performed satisfactorily by brokers. The need for a centralized settlement system is apparent, however. Such a system will not only reduce the settlement time but also reduce the settlement cost.

Entry and exit by foreign investors are fairly easy compared with barriers existing in other emerging markets. Dividend income and the initial capital are easily remittable. The 10% tax on dividend income and interest income and the tax-free capital gains look relatively more attractive than the taxation of many emerging markets.

The market structure shows that while the value of local to foreign investment is about 3:2, the local institutional to individual investment by value is about 1:1. Farmers and artisans play an insignificant investment role on the GSE. Middle aged investors (aged 36-49 years) provide the highest proportion of investment on the GSE.

Most of the investors have a low level of formal education. This translates into the generally poor knowledge about the capital market. There is therefore an urgent need for an intensive educational programme for the population if the stock market is to play the role it is expected to play in the economic development of the nation.

Both individual and institutional investment on the GSE can be termed as small investment. As much as 75% of individual portfolio investment value is below \$5,000. Most institutional investment (35%) is below \$50,000.

The study established that the law of one price does not hold for the pricing of AGC shares on the LSE and the GSE. The random walk test for weak form efficiency also showed that the GSE is inefficient.

The listing of AGC on the GSE has tremendously improved the liquidity of the market. Measures such as capitalization, turnover ratio, capitalization to GDP and value traded to GDP have all shown dramatic improvement as evidence of the improvement in liquidity of the stock market.

In conclusion, the most significant factors impinging on the development of the Ghana stock market as far as the local people are concerned are lack of national awareness, lack of knowledge about stock markets and low incomes of the bulk of the people. This translates into the low number of listed stocks, the low rate of listings, poor patronage in the market and other limitations. The need for a massive educational campaign cannot be over emphasized.

The macroeconomic environment seems very important for foreign investors. If more foreign investors are expected to play an active role on the Ghana stock market, then serious attempts should be made to bring the current inflation of 60% and the rapidly depreciating currency to sanity levels so that their capital base is not eroded.

X. Policy recommendations

A number of recommendations spring from the findings of the study, ranging from education about and promotion of the exchange to streamlining transactions and encouraging the development of investment trusts and funds. Sound macroeconomic policies are also needed. The recommendations are:

1. ***Mount an intensive education and promotion campaign:*** The greatest challenge to the GSE is to improve the level of knowledge of the local investors. A programme of continuous education for the investor, the intermediary, the issuer and the regulator is extremely important for the successful development of the Ghana stock market. This education campaign should involve the development of financial journalists and improvements in the quality of financial market publications.
Financial education should be strengthened in the secondary schools and particularly in the universities. As markets become more sophisticated, there is increasing need for investment advisors and other personnel who are capable of analysing complex financial concepts such as options and other derivatives. Radio and television should be used to reach more people explaining financial investments in securities in both english and local languages.
2. ***Provide fiscal incentives:*** The current tax laws favour the use of debt instruments compared with equity. If the number of firms on the stock market is to grow, then there is need to provide incentives for firms who may want to be listed on the Ghana Stock Exchange. One such incentive is differential taxation in favour of listed companies. Such an incentive will help increase the number of listed companies on the exchange and improve liquidity of the market.
3. ***Provide incentives for market research:*** Greater access to quality research on information useful for investment analysis can be expensive. The introduction of research cost reimbursement packages to brokerage and other intermediaries providing such services will improve the availability of investment information, which will in turn make the market more efficient.
4. ***Establish a centralized settlement system:*** The establishment of a centralized clearing and settlement system sooner than later will substantially improve the present settlement system and cut costs at the same time.
5. ***Pay interest on clients' unused funds by brokers:*** The practice whereby brokers do not pay interest on investors' unused funds is not only unfair but unethical for money accepting financial institutions. Since most of the brokerage firms are either merchant banks or non-bank financial institutions that actually invest such funds in short-term financial instruments, there is no reason why the owners of such funds should not

benefit from the accrued interest of their own funds. If this practice is allowed to continue, the development of the GSE may be compromised.

6. ***Follow prudent macroeconomic policies:*** There is need for the Ghana government to follow prudent macroeconomic policies. The high interest and inflation rates, budget deficits, etc., that have become persistent not only create financial instability, but also feed uncertainty, which affects stock market development.
7. ***Integrate the GSE with the international financial system:*** Because of the current trend of globalization of economies, the management of the GSE must aim at integrating the GSE into the international capital markets. If we are to succeed in this direction, the regulatory authorities must enforce the various regulations on securities. If this is done, both local and foreign investors will feel very protected and freely commit more of their financial resources to the GSE.

The brief suspension of and the imposition of fines against three brokerage houses of the GSE for irregularities in late November 1995 is a sign that the regulatory authorities are enforcing the rules of the game. This is expected to raise investor confidence and integrate the market internationally.

8. ***Regularly review primary and secondary market regulations:*** Primary market regulatory activities on new issues including disclosure, accounting and listing standards must be reviewed periodically to conform to changing international standards. Secondary market activities, such as surveillance and supervision of dealers to maintain high standards, must be monitored to boost investor confidence.
9. ***Encourage the development of investment trusts and funds:*** The fact that most of the investors on the GSE are small investors and also unsophisticated points to the need to encourage brokerage managers to develop funds and unit trusts, including pension funds and index funds.
10. ***Nurture a progressive and sound banking system:*** The banking sector is vital to the development of the capital markets. A progressive and sound banking system is required to quicken the development of the financial market.
11. ***Improve the communication infrastructure:*** There is need for the government to improve the physical infrastructure, particularly the telecommunication infrastructure, which is the pivot around which business on the financial market revolves.
12. ***Encourage additional cross-listing:*** There is a positive spillover effect of the international cross-listing of AGC to the GSE. Other well managed and qualified firms must therefore be encouraged through incentive packages to move to international cross-listing.

Notes

1. Databank Ltd was alleged to have contravened the GSE regulation that any one external resident portfolio investor cannot hold more than 10% of any listed security. Further to this, the total holding of all external residents in one listed company should not exceed 74%. This regulation was alleged to have been breached when the government sold its shares in seven listed companies – Unilever, EIC, GGL, KBL, PTC, SCB and ABL – in 1994.
EBG Stockbrokers, Ltd., on the other hand, was alleged to have broken the clearing and settlement rules. GSE investigations showed that transactions between EBG and Databank took more than the stipulated 14 calendar days.
2. March 14, April 16, May 17 and June 24 1994 correspond with trading sessions 333, 341, 350 and 365, respectively.
3. Information made available by Barclays Bank Ghana Ltd, registrar of Ashanti Goldfields Corporation.
4. Market return $R_{mt} = \sum w_{it} r_{it}$ (portfolio return) where, w_{it} = weight of stock i on the stock market on day t measured as capitalization of stock on day t divided by total market capitalization on the same day.
 r_{it} = return of stock i on day t , measured as
$$\frac{d_{it+1}}{p_{it}} + (p_{it+1} - p_{it})/p_{it}$$
 where, d_{it+1} = dividend on day $t+1$, of stock i ,
 p_{t+1} and p_t are price of stock i on days $t+1$, and t
NB. Since we are considering daily and weekly figures d_{it+1}/p_{it} = zero
5. The computer software used for the statistical analysis is Microfit.
6. Calculation of transaction cost based on current stock price of ₵31,000 and minimum of 100 shares per trading:

Brokerage commission - local and foreign	=	₵54,250+54,250
(it is assumed the two are the same)	=	₵108,500
GSE Levy (0.05% of stock value)	=	₵1,550
Funds transfer (\$60 +0.75% of value)	=	₵119,250
Fax (P & T rate)	=	₵12,600
Phone (5 minutes to UK)	=	₵23,000
Total	=	₵264,900
Transaction cost per share	=	2,650
7. The high values of the first order serial correlation are typical of thinly traded markets. Time-varying risk premium is another source of serial correlation in stock returns.

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Appendix A: Evidence of regulation enforcement on the GSE by the Security Regulatory Commissioner

(Letter issued by the commissioner and printed in the local papers in early December 1995)

BANK OF GHANA

**NOTICE TO BANKS AND THE PUBLIC
NOTICE NO. BG/GOV/SEC/95/29**

**REMEDIAL MEASURES AT THE
GHANA STOCK EXCHANGE**

Following some recent occurrences at the Ghana Stock Exchange, the Governor in his capacity as the Securities Regulatory Commissioner has, in accordance with Section 30 (1) of the Securities Industries Law 1993, directed the Council of the Ghana Stock Exchange to take some remedial measures as follows:

1. that the membership of the EBG Stockbrokers Limited of the Council of the Ghana Stock Exchange should be terminated:

EBG Stockbrokers have been fined for some irregularities and this is inconsistent with their continued membership of the Council.

2. that the membership of the SDC Brokerage Limited of the Council of the Ghana Stock Exchange should be terminated:- The irregularities at the SDC and the continuing investigations make it inappropriate for the Company to continue to be a member of the Council.

3. that Mr. Afare Donkor's membership of the Council should be terminated:-

This is in view of his connection with SDC affairs.

4. that Databank Brokerage Limited should be suspended from the Exchange.

Out of four cases of irregularities reported to the Securities Regulatory commissioner, three involve the Databank Brokerage Limited, two of which attracted fines imposed by the Exchange.

These measures are intended to enhance public confidence in the Ghana Stock Exchange.

A. Bernasko
The Secretary

8th December 1995

Appendix B: Cost of going public by 3 firms listed on the GSE

Super Paper Products Company, Ltd.*

Total capital raised: ₡630,000,000

Type of expense incurred	Amount	Expense as % of capital raised
Application and listing fee	5,180,000	0.8222
Valuation fee	1,200,000	0.1905
Advertising	25,000,000	3.9683
Printing of prospectus	15,000,000	2.3810
Registrar's fee Miscellaneous	5,000,000	0.7937
Total cost incurred	56,380,000	8.9492

Mechanical Lloyd Company Limited**

Total capital raised: ₡486,000,000

Type of expense incurred	Amount	Expense as % of capital raised
Application for listing on the GSE	1,300,000	0.2675
Listing on the GSE	2,700,000	0.5556
Cost of printing prospectus	6,917,000	1.4233
Publicity and advertising	20,292,000	4.1753
Registrar's fees	1,000,000	0.2058
Commission and brokerage charges	18,221,731.50	3.7493
Public flotation expenses	6,000,000	1.2346
Petty cash	29,000	0.006
Total cost incurred	56,459,731.50	11.6172

Home Finance Company ***

Flotation capital raised: ₡1,312,450,000

Type of expense incurred	Amount	Expense as % of capital raised
Listing and annual fees to GSE	5,240,000	0.3993
Valuation and accounting fee	13,124,500	1
Advertisements	5,418,550	0.4129
Printing of prospectus	3,140,250	0.2393
Registrar's fees	3,847,150	0.2931
Total cost incurred	30,770,450	2.3445

* Flotation was in second quarter of 1992 by public placement.

** Flotation was in second quarter of 1994 by public placement.

*** Flotation was in first quarter of 1995 by private placement.

Appendix C: Ghana Stock Exchange brokerage commissions

Ordinary and preference shares

Value Traded (¢)	Commission	Cumulative commission
First 10,000	¢800 flat	
10,001-30,000	¢900 flat	
30,001-50000	¢1,500 flat	
50,001-0.5m	2.5%	¢12,750 max
500,001-1m	2.0%	¢22,750 max
1,000,001-5m	1.75%	¢92,750 max
5,000,001-10m	1.5%	¢167,750 max
Over 10m	1%	

Government and corporate bonds

Value Traded (¢)	Commission	Cumulative commission
First 10,000	¢800 flat	
10,001-30,000	¢900 flat	
30,001-50000	¢1,500 flat	
50,001-0.5m	2.5%	¢12,750 max
500,001-1m	2.0%	¢22,750 max
1,000,001-5m	1.75%	¢92,750 max
5,000,001-10m	1.5%	¢167,750 max
Over 10m	0.25%	

Source: Ghana Stock Exchange.

Appendix D: Ghana Stock Exchange fees

Application fees

Market capitalization ¢	Founder members ¢ m	Other members ¢ m	Non members ¢ m
30m or less	.05	.2	.35
31-100m	.15	.45	.75
101-500m	.25	.60	1.00
.51-1b	.40	.75	1.15
1.1-2b	.45	.90	1.35
2.1-2.5b	.55	1.05	1.60
2.51-5b	.60	1.20	1.80
5.1-10b	.90	1.80	2.70
10.1-20b	1.20	2.10	3.00
20.1-50b	1.69	2.70	3.71
50.1-100b	2.03	3.04	4.05
100.1-200b	2.36	3.38	4.39
200.1-500b	2.70	3.70	4.70
500.1-1000b	3.00	4.50	6.50
1000.1-1500b	4.00	6.00	8.50
1500.1-2000b	5.00	7.00	10.75
Over 2000b	7.00	10.00	13.00

Listing fees (original and additional)

Market capitalization	Founder members	Other members	Non members
30m or less	.10	.50	.90
31-100m	.30	1.15	1.85
101-500m	.55	1.50	2.45
.51-1b	.75	2.25	3.75
1.1-2b	1.50	3.00	4.50
2.1-2.5b	1.80	3.60	5.40
2.51-5b	1.90	3.80	5.65
5.1-10b	2.64	4.82	7.20
10.1-20b	3.24	6.00	8.40
20.1-50b	4.46	8.10	10.80
50.1-100b	5.27	9.45	12.15
100.1-200b	6.08	10.80	13.50
200.1-500b	7.00	12.50	15.00

cont. next page

Appendix D cont.

Market capitalization	Founder members	Other members	Non members
500.1-1000b	8.00	14.00	25.00
1000.1-1500b	13.00	20.00	36.00
1500.1-2000b	20.00	28.00	47.00
Over 2000b	25.00	36.00	60.00

Annual fees

Market capitalization	Founder members	Other members	Non members
30m or less	0.05	0.20	0.35
31-100m	0.15	0.45	0.75
101-500m	0.25	0.60	1.00
.51-1b	0.40	0.75	1.15
1.1-2b	0.45	0.90	1.35
2.1-2.5b	0.55	1.05	1.60
2.51-5b	0.72	1.44	2.16
5.1-10b	0.98	1.95	2.93
10.1-20b	1.30	2.26	3.38
20.1-50b	1.95	2.99	3.90
50.1-100b	2.27	3.38	4.55
100.1-200b	2.60	3.90	5.20
200.1-500b	3.50	4.50	6.00
500.1-1000b	5.00	9.00	12.00
1000.1-1500b	8.00	15.00	18.00
1500.1-2000b	12.00	20.00	22.00
Over 2000b	16.00	25.00	30.00

Source: Ghana Stock Exchange.

Appendix E: Investment regulations summary for entering and exiting Emerging Markets (as of end 1994)

Entry	Exit	
	Income	Repatriation of Capital
<i>Free entry</i>		
Argentina	Free	Free
Bangladesh	Free	Free
Botswana	Free	Free
Brazil	Free	Free
Czech Republic	Free	Free
Costa Rica	Free	Free
Ghana	Free	Free
Greece	Free	Free
Hungary	Free	Free
Malaysia	Free	Free
Mexico	Free	Free
Pakistan	Free	Free
Peru	Free	Free
Poland	Free	Free
Portugal	Free	Free
South Africa	Free	Free
Turkey	Free	Free
<i>Relatively free entry</i>		
Chile	Free	After 1 year
Indonesia	Some restrictions	Some restrictions
Jamaica	Free	Free
Kenya	Free	Free
Korea	Free	Free
Sri Lanka	Some restrictions	Some restrictions
Thailand	Free	Free
Trinidad and Tobago	Free	Free
Venezuela	Some restrictions	Some restrictions
Zimbabwe	Free	Free
<i>Special classes of shares</i>		
China	Free	Free
Philippines	Free	Free
<i>Authorized investors only</i>		
Colombia	Free	Free
India	Free	Free

cont. next page

Appendix E cont.

Availability of stocks to foreign investors	Repatriation of	
	Income	Capital
Jordan	Free	Free
Mauritius	Free	Free
Taiwan	Some restrictions	Some restrictions
<i>Closed</i>		
Nigeria	Some restrictions	Some restrictions

Key to entry:

1. Free entry: No significant restrictions to purchasing stocks.
2. Relatively free entry: Some registration procedures required to ensure repatriation rights.
3. Special classes: Foreigners restricted to certain classes of stocks, designated for foreign investors.
4. Authorized investors only: Only approved foreign investors may buy stock.
5. Closed: Closed, or access severely restricted (e.g., for non-resident nationals only).

Key to exit:

1. Repatriation of income: Dividends, interest, and realized capital gains.
2. Repatriation of capital: Initial capital invested.
3. Free: Repatriation done routinely.
4. Some restrictions: Typically requires some registration with or permission of Central bank, Ministry of Finance, or an Office of Exchange Controls that may restrict the timing of exchange release.

Source: IFC 1995 Factbook, Emerging Markets Data Base, p. 265.

Appendix F: Withholding Taxes for Emerging Markets

Market	Interest (%)	Dividends (%)	Long-term capital gains on listed shares (%)
<i>Latin America/Caribbean</i>			
Argentina	0	0	0
Barbados	15	15	0
Brazil	10	15	0
Chile	10	10	10
Columbia	0	0	0
Costa Rica	8	5	0
Jamaica	15	15	0
Mexico	15	0	0
Panama	0	10	0
Peru	0	0	0
Trinidad & Tobago	25	25	20
Venezuela	0	0	1
<i>Asia</i>			
China	0	20	0
India	20	20	0
Indonesia	15	15	0
Korea	12.9	16.125	0
Malaysia	20	0	0
Pakistan	10.5	10	0
Philippines	20	25	0
Sri Lanka	0	15	0
Taiwan	20	20	0
Thailand	15	10	0
<i>Europe/Mid East</i>			
Cyprus	0	30	0
Czech Republic	0	0	0
Greece	15	0	0
Hungary	0	10	20
Jordan	0	0	0
Poland	0	15	0
Portugal	0	12.5	0
Turkey	0	0	0
<i>Africa</i>			
Botswana	15	15	0
Cote d'Ivoire	5	12	20
Ghana	10	10	0

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Appendix F cont.

Market	Interest (%)	Dividends (%)	Long-term capital gains on listed shares (%)
Kenya	10	10	0
Mauritius	0	0	0
Morocco	20	15	0
Namibia	0	10	0
Nigeria	10	10	20
South Africa	0	15	0
Swaziland	10	15	0
Tunisia	15	0	0
Zimbabwe	15	15	10

Source: IFC 1995 Factbook, Emerging Markets Data Base.

Appendix G: Questionnaire sent to brokers on the Ghana Stock Exchange

MARKET STRUCTURE

1. How do you categorize your clients in terms of value of investments? (Give percentages)
 - a. % local investors
 - b. % foreign investors

Local investors

2. What type of local investors do you have as your clients? (Give percentages in terms value of investments)
 - a. % individuals
 - b. % institutions

Individual investors

3. What kind of work do your clients do? (Give percentages)
 - a. % farmers,
 - b. % artisans, e.g., carpenters, masons, electricians etc.
 - c. % small business owners, storekeepers, retailers, etc.
 - d. % office clerks, etc.
 - e. % middle managers
 - f. % chief executives, managing directors, etc.
 - g. % pensioners
4. What is the age profile of the local individual investors? Give rough percentages
 - a. % above 50 years
 - b. % middle aged 35-49 years
 - c. % young adults 25-35 years
 - d. % young people 18-24 years
5. What income group do your clients belong? (Give percentages)
 - a. % low income (below 1.5 million cedis/annum)
 - b. % middle income (between 1.5m-3m cedis/annum)
 - c. % upper middle income (between 3m-5m cedis/annum)
 - d. % high income group (above 5 million cedis/annum)
6. What is the educational background of your clients?
 - a. % no formal schooling
 - b. % secondary school leavers
 - c. % sixth form or technical education
 - d. % university education or equivalent
7. Do your clients have a good working knowledge of the capital market? e.g., the various instruments, the ability to read and interpret company statements, financial statements, etc. (give percentages)
 - a. % no knowledge
 - b. % fairly good knowledge
 - c. % highly knowledgeable
8. What is the value of individual portfolio investment? (Give percentages)
 - a. % below 1 million cedis investment
 - b. % between 1-2 million cedis investment

- c. % between 2-3 million cedis investment
 - d. % between 3-4 million cedis investment
 - e. % over 5 million cedis investment
9. What is the number of investments in an individual portfolio of investments? (Give percentages)
- a. % portfolio made up of one company
 - b. % portfolio made up of 2-3 companies
 - c. % portfolio made up of 4-5 companies
 - d. % portfolio made up of 6-7 companies
 - e. % portfolio of over 7 companies

Local institutional investors

10. How many local institutional investors are your clients?
11. Do these institutions actively buy and sell shares on the Ghana Stock Exchange?
- a. yes b. no
12. What is the value of the institutional portfolio investment?
- a. % below 5 million cedis
 - b. % between 6-10 million cedis
 - c. % between 11-20 million cedis
 - d. % between 21-50 million cedis
 - e. % above 50 million cedis
13. What is the number composition of investments in an institutional portfolio investment? (Give percentages)
- a. % portfolio made up of one company
 - b. % portfolio made up of 2-3 companies
 - c. % portfolio made up of 4-5 companies
 - d. % portfolio made up of 6-7 companies
 - e. % portfolio of over 7 companies

Foreign Investors

14. Do you have any foreign investors as your clients?
- a. Yes b. No
- If yes
- Which countries have they come from? (list 5 countries with the highest number of investors first)
15. Which listed companies are more patronized by the foreign investors? (list 5 with the most patronized first)
16. How do your foreign clients get market information?
- a. b. c.

BUYING AND SELLING BY A STOCKBROKER

17. What is the average waiting period between order to buy/sell put by a client and purchase/sell by stockbroker?
- Give number of days
18. What is the system of payment by client?
- a. money deposited with broker into security account before purchase of shares
 - b. payment made after purchase of shares
- If answer to 17 is (a) does money deposited yield any interest during the waiting period?
- a. Yes (indicate percent interest given)
 - b. No
19. How many days does it take a broker to send a purchase or sale report to a client?
-days.
20. How many days does it take a client to receive the report of purchase?
-days.

SECURITY TRADING

21. How do you describe trading on the Ghana Stock Exchange?
 - a. very transparent (every transaction is made known to the public)
 - b. some trading is conducted privately outside the GSE (e.g. over the counter market).
22. How do you determine prices in 21(b)? Describe process
23. Which body oversees that quantity and price declared by a broker is correct?
24. How long does it take to deliver and settle purchases of shares between two brokerage firms?
25. How long does a buyer of securities wait before his name goes into the registrar's books?
26. Some investors never receive their certificates. Why?

DIVIDENDS

27. Do all your clients receive their dividends?
 - a. Yes b. NoIf no why
If yes how do you know?
28. Some investors have sold their securities but receive dividend. Why?

INVESTMENT BANKING/MANAGEMENT

29. Which companies have gone public with your firm as the leading brokerage firm? List
30. What was the percentage cost to total issued value of the cost items listed below? Please note the list below may not necessarily exhaust the cost items.
 - a. Listing fee payable to GSE
 - b. Application fee
 - c. registration fee
 - d. valuation fee
 - e. advertising
 - f. printing
 - g. brokerage fees
 - h. solicitors(to the issue, trustee, company)
 - i. reporting accountant
 - j. registrar's fee
 - k. etc.
31. Indicate period between date of offer to public and date of first trading on the GSE.
32. Does your brokerage firm provide investment or funds management service?
 - a. yes
 - b. no

MARKET ANALYSIS

33. Do you provide any kind market analysis for your clients
 - a. Yes
 - b. No
34. How do your clients receive market information?
35. What do you see as the main impediments to the development of the GSE?

ASHANTI GOLDFIELDS CORPORATION (AGC)

36. Do your clients buy and sell between the London Stock Exchange and the Ghana Stock Exchange?
37. What are the main transaction costs for such transactions?
 - a. b. c.
38. Why would local holders of AGC shares want to sell on the London Stock Market and not on the local market?

Appendix H: Participants in courses run by the GSE

Type of course	Year				Total
	1991	1992	1993	1994	
Basic Securities	154	152	120	228	654
Advanced Securities	164	103	105	203	575
Securities Selling and Investment Advice	55	25	43	103	226
Securities Trading	4	23	31	-	58
Directors	-	35	-	-	35
Total	377	338	299	534	1548

Source: Ghana Stock Exchange.

Appendix I: Analysis of AGC prices in London and Accra

Trading dates of the Ghana Stock Exchange	AGC price on the London Stock Exch. (Quoted in £)	Exchange rate (bureau rate cedis/£)	AGC price in London converted into cedis	AGC price in Accra (cedis) Quoted on the GSE
23/05/94	14.625	1371.25	*20055	20700
25/05/94	15	1373.75	20606	20700
27/05/94	15.09375	1375	20754	20700
30/05/94	15.09375	1375	*20754	20700
1/06/94	15.03125	1372	20630	20700
3/06/94	15.09375	1375.5	20761	20700
8/06/94	14.96875	1377.5	*20619	20700
10/06/94	14.90625	1380	20571	20700
13/06/94	14.625	1380.5	*20190	20700
15/06/94	14.40625	1386.75	19978	20700
17/06/94	14.46875	1387.5	20075	20000
20/06/94	14.1875	1392.5	*19756	20000
22/06/94	14.0625	1404.4	19749	20000
24/06/94	14	1408	19712	20000
27/06/94	13.59375	1411	*19181	20000
29/06/94	13.5625	1414.6	19186	20000
4/07/94	12.9375	1421	*18384	19200
6/07/94	12.9375	1426.6	18457	19200
8/07/94	-	1434	-	19200
11/07/94	12.875	1439	*18527	19200
13/07/94	-	1445	-	19200
15/07/94	-	1464	-	19000
18/07/94	12.6875	1485	*18841	19000
20/07/94	12.875	1515	19506	19000
22/07/94	13	1532	19916	19000
25/07/94	12.96875	1550	*20102	19000
27/07/94	13.125	1547	20304	19000
29/07/94	13.0625	1515	19790	19000
1/08/94	13	1444	*18772	19000
3/08/94	-	1442	-	19000
5/08/94	12.96875	1452	18831	19000
8/08/94	12.96875	1453	*18844	19000
10/08/94	13.0625	1468	19176	18980
12/08/94	13	1476	19188	18980
15/08/94	12.9375	1480	*19148	18980

Trading dates of the Ghana Stock Exchange	AGC price on the London Stock Exch. (Quoted in £)	Exchange rate (bureau rate cedis/£)	AGC price in London converted into cedis	AGC price in Accra (cedis) Quoted on the GSE
17/08/94	-	1482	-	19000
19/08/94	12.75	1482	18896	19000
22/08/94	12.75	1491	*19010	19000
24/08/94	12.65625	1490	18858	19000
26/08/94	12.65625	1485	18795	19000
29/08/94	-	1486	-	19000
31/08/94	12.6875	1490.6	*18912	19000
2/09/94	12.5625	1492	18743	18600
5/09/94	12.4375	1497	*18619	18600
7/09/94	12.5625	1500	18844	18400
10/09/94	12.5625	1513.4	19012	18400
12/09/94	12.46875	1516	*18903	18000
14/09/94	12.53125	1528.4	19153	18000
16/09/94	12.40625	1533	19019	18000
19/09/94	11.96875	1532	*18336	18000
21/09/94	12.21875	1536	18768	18000
23/09/94	12.5	1540	19250	18000
26/09/94	12.5	1546	*19325	18400
28/09/94	12.75	1546	19712	19000
30/09/94	12.75	1549.6	19757	19300
3/10/94	12.78125	1547	*19773	19500
5/10/94	12.71875	1552	19740	19500
7/10/94	13.09375	1557	20387	19700
10/10/94	13.6875	1556	*21298	19700
12/10/94	13.46875	1561	21025	19700
14/10/94	13.65625	1567.4	21405	19950
17/10/94	13.53125	1568.4	*21222	19950
21/10/94	13.3125	1590.4	21172	19970
24/10/94	13.25	1598	*21174	19990
26/10/94	13.15625	1607	21142	20000
28/10/94	13.09375	1623	21251	20000
31/10/94	12.96875	1628	*21113	20001
2/11/94	13.15625	1629	21432	20001
4/11/94	13.84375	1634	22621	20050
7/11/94	13.78125	1637.4	*22565	20060
9/11/94	13.71875	1642.4	22532	20100
11/11/94	13.75	1645.6	22627	20205
14/11/94	13.78125	1647.4	*22703	20210
16/11/94	13.59375	1648.4	22408	20310
18/11/94	13.65625	1657.4	22634	20420
21/11/94	13.65625	1659.6	*22664	20420
23/11/94	13.40625	1666	22335	20420
25/11/94	13.59375	1668.4	22680	20420
28/11/94	13.59375	1670.4	*22707	20420
30/11/94	13.5625	1659	22500	20600
5/12/94	13.46875	1629	*21941	20600
7/12/94	13.25	1628	21571	20600
9/12/94	13.09375	1635	21408	20600

Trading dates of the Ghana Stock Exchange	AGC price on the London Stock Exch. (Quoted in £)	Exchange rate (bureau rate cedis/£)	AGC price in London converted into cedis	AGC price in Accra (cedis) Quoted on the GSE
12/12/94	13.03125	1634	21293	-
14/12/94	13.1875	1642	*21654	20600
16/12/94	13.375	1650	22069	20600
19/12/94	13.4375	1650	*22172	20600
21/12/94	13.71875	1645	22567	20600
23/12/94	13.84375	1635	22635	20600
28/12/94	13.90625	1640	*22806	20600
30/12/94	13.8125	1643	22694	21000
4/01/95	13.78125	1640	*22601	21000
6/01/95	13.6875	1646	22530	21000
9/01/95	13.46875	1649	*22210	21000
11/01/95	13.46875	1650	22223	21001
13/01/95	13	1655.6	21523	21001
16/01/95	13	1657	*21541	21051
18/01/95	13.46875	1658	22331	21170
20/01/95	13.28125	1662	22073	21180
23/01/95	13.25	1662	*22022	21300
25/01/95	13.28125	1665	22113	21340
27/01/95	13.125	1668.4	21898	21340
30/01/95	13.125	1669.6	*21914	21350
1/02/95	13.28125	1670	22180	21350
3/02/95	13.1875	1675	22089	21350
6/02/95	13.3125	1677.4	*22330	21350
8/02/95	13.4375	1681	22588	21350
10/02/95	13.46875	1683	22668	21350
13/02/95	13.28125	1684.4	*22371	21350
15/02/95	13.28125	1687.8	22416	21350
17/02/95	13.3125	1694	22551	21350
20/02/95	13.25	1697.6	*22493	21350
22/02/95	-	1699.4	22570	21350
24/02/95	13.375	1701.6	22759	21350
27/02/95	13.28125	1707	*22671	21350
1/03/95	13.4375	1708	22951	21350
8/03/95	13.3125	1709.4	*22756	21350
10/03/95	13.65625	1711	23366	21350
13/03/95	13.65625	1715	*23420	21350
15/03/95	13.71875	1719	23583	21350
20/03/95	13.84375	1732	*23977	21380
22/03/95	13.78125	1743	24021	21380
24/03/95	14.03125	1755	24625	21380
27/03/95	14.40625	1769	*25485	21400
29/03/95	14.875	1781.6	26501	21400
31/03/95	15.1875	1787	27140	21400
3/04/95	15.78125	1789.4	*28239	21400
5/04/95	15.75	1792	28224	22000
7/04/95	15.71875	1797	28247	25200
10/04/95	15.6875	1800	*28238	26000
12/04/95	15.65625	1798.6	28159	26000
18/04/95	15.5625	1802.6	*28053	27000
19/04/95	15.5625	1802.6	28053	26000

Trading dates of the Ghana Stock Exchange	AGC price on the London Stock Exch. (Quoted in £)	Exchange rate (bureau rate cedis/£)	AGC price in London converted into cedis	AGC price in Accra (cedis) Quoted on the GSE
21/04/95	15.5625	1802	28044	26200
24/04/95	15.625	1795	*28047	26200
26/04/95	15.53125	1803	28003	26200
28/04/95	15.53125	1813	28158	26500
2/05/95	15.65625	1816	*28432	26500
3/05/95	15.625	1820	28438	26500
5/05/95	15.9375	1820	29006	26700
8/05/95	15.9375	1822	*29038	26700
10/05/95	15.65625	1826.2	28591	26700
12/05/95	15.53125	1830.6	28432	26700
15/05/95	15.53125	1828	*28391	26700
17/05/95	15.4375	1832.6	28291	26700
19/05/95	15.46875	1835	28385	26700
22/05/95	15.40625	1837	*28301	26700
24/05/95	15.3125	1840.4	28181	26700
26/05/95	15.25	1847.6	28176	26700
29/05/95	15.25	1849	*28197	26700
31/05/95	14.375	1854	26651	26700
2/06/95	14.15625	1853.6	26240	26000
6/06/95	14	1855	*25970	25500
7/06/95	13.96875	1856	25926	25200
9/06/95	13.90625	1857	25824	25200
12/06/95	13.9375	1861	*25938	25200
14/06/95	13.53125	1863.2	25211	25200
16/06/95	14.15625	1910	27038	25200
19/06/95	13.96875	1910	26680	25200
21/06/95	14.59375	1920	*28020	25200
23/06/95	14.59375	1930	28166	25300
26/06/95	14.78125	1930	28528	25300
28/06/95	14.71875	1935	*28481	25400
30/06/95	14.625	1940	28373	25550
3/07/95	14.21875	1940	27584	25600
5/07/95	14.21875	1880	*26731	25400
7/07/95	14.125	1910	26979	25550
10/07/95	14.3125	1910	27337	25410
12/07/95	13.96875	1930	*26960	25410
14/07/95	13.875	1930	26779	25350
17/07/95	13.84375	1930	26718	25000
19/07/95	13.78125	1935	*26667	25000
21/07/95	13.8125	1950	26934	25100
24/07/95	13.84375	1930	26718	25200
26/07/95	14.09375	1930	*27201	25200
28/07/95	14.03125	1930	27080	25200
31/07/95	13.90625	1925	26770	25200
2/08/95	13.75	1930	*26538	25300
4/08/95	13.96875	1930	26960	25300
7/08/95	13.78125	1920	26460	25300
9/08/95	13.75	1930	*26538	25300
14/08/95	13.46875	1930	25995	24800
16/08/95	13.75	1930	*26538	24800

Trading dates of the Ghana Stock Exchange	AGC price on the London Stock Exch. (Quoted in £)	Exchange rate (bureau rate cedis/£)	AGC price in London converted into cedis	AGC price in Accra (cedis) Quoted on the GSE
18/08/95	13.8125	1940	26796	24800
21/08/95	13.78125	1940	26736	24800
23/08/95	13.71875	1940	*26614	25000
28/08/95	13.5625	1940	26311	25000
30/08/95	13.4375	1945	*26136	24900
13/09/95	13.0625	1990	*25994	24100
15/09/95	13.03125	1995	25997	24100
18/09/95	13.125	2040	26775	24100
20/09/95	13.21875	2050	*27098	24100
22/09/95	12.8125	2090	26778	24100
25/09/95	12.875	2130	27424	24100
27/09/95	12.78125	2150	*27480	24100
29/09/95	12.9375	2170	28074	24100
2/10/95	12.90625	2160	27878	24100
4/10/95	12.75	2150	*27413	24100
9/10/95	12.25	2160	26460	24100
13/10/95	12.78125	2180	27863	24000
16/10/95	12.375	2175	26916	24000
18/10/95	12.4375	2180	*27114	24000
20/10/95	12.375	2180	26978	24000
25/10/95	12.34375	2200	*27156	24015
27/10/95	12.34375	2205	27218	24100
30/10/95	11.25	2200	24750	24150
1/11/95	11.15625	2235	*24934	23000
3/11/95	11.625	2240	26240	23000
6/11/95	11.875	2250	26719	23800
8/11/95	12.34375	2280	*28144	23800
10/11/95	12.3125	2285	28134	24000
13/11/95	12.1875	2310	28153	24000
15/11/95	11.96875	2360	*28246	24000
17/11/95	11.75	2420	28435	23800
20/11/95	12.125	2430	29464	23800
22/11/95	11.59375	2430	*28173	23800
24/11/95	11.84375	2430	28780	23800
27/11/95	11.6875	2430	28401	25000
29/11/95	11.96875	2380	*28486	23800
6/12/95	12.65625	2050	25945	24100
8/12/95	13.25	2200	*29150	24250
11/12/95	13.53125	23000	31122	24300
18/12/95	13	2300	29900	24300
20/12/95	13.09375	2300	30116	24300
22/12/95	13.0625	2300	*30044	24320
27/12/95	12.90625	2300	29684	24400
29/12/95	12.84375	2300	*29541	24400

Source: AGC price in London from the *Financial Times* of London Market Exchange rate figures is average of 5 bureau rates AGC price in Accra from the Ghana Stock Exchange

*London AGC prices marked with asterisks with corresponding Accra price were used to run regression based on weekly data.

Appendix J: Daily market returns of the GSE from 1993-1995

Trading session	Daily mkt-rtn	C'lative mkt-rtn	Trading session	Daily mkt-rtn	C'lative mkt-rtn
215	4.3648	4.3648	264	-0.2025	49.0036
216	4.0580	8.4228	265	1.3352	50.3387
217	4.0604	12.4832	266	0.6975	51.0362
218	4.0871	16.5703	267	0.7145	51.7507
219	5.7004	22.2706	268	0.3829	52.1336
220	3.7959	26.0665	269	1.2199	53.3536
221	2.3443	28.4108	270	1.4858	54.8394
222	.9233	29.3340	271	2.0433	56.8827
223	3.0611	32.3951	272	1.7017	58.5844
224	.3332	32.7283	273	3.1988	61.7832
225	-0.6475	32.0808	274	0.5253	62.3085
226	3.9584	36.0392	275	-0.2145	62.0940
227	-0.4275	35.6117	276	0.2670	62.361
228	-5.0086	30.6031	277	0.3831	62.7441
229	-2.8171	27.7860	278	-0.7289	62.0153
230	-6.1704	21.6156	279	0.7604	62.7757
231	10.3744	31.9900	280	-0.4243	62.3514
232	0.3056	32.2956	281	1.2732	63.6246
233	1.5548	33.8504	282	-0.1218	63.5028
234	0.6479	34.4983	283	-1.1474	62.3554
235	3.6444	38.1428	284	0.4644	62.8199
236	3.5579	41.7006	285	1.3379	64.1577
237	0.1831	41.8837	286	0.9089	65.0667
238	0.1105	41.9942	287	2.2506	67.3172
239	-0.7187	41.27553	288	0.4219	67.7391
240	0.1615	41.4370	289	0.8536	68.5927
241	0.3678	41.8048	290	1.2214	69.8141
242	0.1948	41.9997	291	-0.4330	69.3811
243	0.0574	42.0571	292	0.1690	69.55
244	-0.9344	41.1227	293	0.1920	69.7420
245	1.1260	42.2487	294	2.1819	71.9239
246	0.05944	42.3082	295	0.3551	72.279
247	0.5739	42.8821	296	0.2317	72.5107
248	0.7138	43.5959	297	0.3217	72.8324
249	0.3173	43.9132	298	5.7730	78.6055
250	0.3475	44.2607	299	1.0709	79.6764
251	0.5589	44.8196	300	0.0510	79.7275
252	0.2195	45.0391	301	1.5046	81.232

Appendix J cont.

Trading session	Daily mkt-rtn	C'lative mkt-rtn	Trading session	Daily mkt-rtn	C'lative mkt-rtn
253	-0.1885	44.8506	302	-0.2163	81.0157
254	0.5066	45.3573	303	0.0145	81.0301
255	-0.0981	45.2592	304	0.6529	81.683
256	0.3455	45.6047	305	5.6289	87.3119
257	0.8247	46.4294	306	1.9878	89.2997
258	1.4345	47.8639	307	1.5262	90.8259
259	1.6229	49.4868	308	-0.1688	90.6571
260	0.0329	49.5198	309	0.0926	90.7493
261	0.2799	49.7996	310	0.1196	90.8693
262	-0.1418	49.6578	311	-0.1008	90.7686
263	-0.4518	49.2060	312	1.6631	92.4316

TS	DMR	CDR	TS	DMR	CDR	TS	DMR	CDR
313	0.09	92.52	361	-.18	195.56	409	0.8177	192.14
314	0.03	92.55	362	-3.0	192.61	410	-.003	192.14
315	3.61	96.16	363	-.10	192.52	411	-.04	192.10
316	0.07	96.23	364	.005	192.52	412	1.1617	193.26
317	0.43	96.66	365	-.20	192.32	413	-2.794	190.47
318	1.39	98.05	366	0.04	192.35	414	3.0286	193.50
319	-.18	97.87	367	0.05	192.40	415	0.0442	193.54
320	0.63	98.5	368	-3.4	189.01	416	0.0841	193.63
321	0.39	98.89	369	0.02	189.03	417	.02201	193.65
322	0.13	99.01	370	0.44	189.47	418	.0368	193.68
323	0.38	99.40	371	-.88	188.59	419	-.0659	193.62
324	0.55	99.95	372	0.95	189.54	420	-.0007	193.62
325	0.20	100.15	373	-.98	188.55	421	.1682	193.79
326	0.37	100.52	374	-.01	188.55	422	.0471	193.83
327	7.50	108.02	375	0.09	188.64	423	.2153	194.05
328	2.44	110.46	376	0.04	188.68	424	.4559	194.50
329	4.26	114.72	377	.005	188.68	425	.0206	194.53
330	8.29	123.00	378	-.02	188.66	426	.3894	194.91
331	2.79	125.79	379	-.27	188.40	427	.4712	195.39
332	6.12	131.91	380	-.08	188.31	428	-.1122	195.27
333	5.19	137.10	381	-.03	188.3	429	-.0416	195.23
334	5.07	142.17	382	-.02	188.26	430	-.0276	195.20
335	5.72	147.89	383	.008	188.26	431	.1161	195.32
336	4.95	152.84	384	-.10	188.17	432	.6721	195.99
337	4.71	157.55	385	-.04	188.13	433	-.0071	195.99
338	4.14	161.68	386	.019	188.15	434	-.0037	195.98
339	2.63	164.32	387	.105	188.25	435	-.0233	195.96
340	6.30	170.62	388	.027	188.27	436	-.0107	195.95
341	4.22	174.84	389	.059	188.34	437	-.0089	195.94
342	2.63	177.47	390	.024	188.36	438	.0094	195.95
343	12.7	190.14	391	.021	188.38	439	-.0048	195.94
344	2.62	192.76	392	.024	188.41	440	.0148	195.96
345	0.56	193.32	393	.011	188.42	441	0	195.96
346	0.77	194.10	394	-1.8	186.61	442	-.0026	195.96

Appendix J cont.

TS	DMR	CDR	TS	DMR	CDR	TS	DMR	CDR
347	0.15	194.25	395	-.004	186.6	443	1.738	197.69
348	5.86	200.11	396	-.89	185.72	444	-.0152	197.68
349	-.48	199.63	397	.064	185.78	445	.0015	197.68
350	.012	199.65	398	-1.87	183.9	446	0	197.68
351	-3.4	196.21	399	.130	184.04	447	.0128	197.69
352	.008	196.22	400	.021	184.06	448	-.005	197.69
353	-.38	195.84	401	.011	184.07	449	.2017	197.89
354	0.66	196.50	402	-.024	184.05	450	.496	198.39
355	-.07	196.43	403	.059	184.11	451	.0535	198.44
356	.001	196.43	404	2.06	186.17	452	.4798	198.92
357	-.14	196.29	405	2.77	188.94	453	.1589	199.08
358	-.22	196.06	406	1.40	190.35	454	.0004	199.08
359	-.19	195.87	407	.987	191.33	455	.0406	199.12
360	-.13	195.74	408	-.006	191.33	456	-.032	199.09
457	-.001	199.09	504	.024	219.78	551	-0.013	210.848
458	-.02	199.07	505	.005	219.79	552	.0167	210.864
459	-.002	199.07	506	-2.61	217.18	553	-.0004	210.86
460	-.002	199.07	507	-1.56	215.62	554	.0177	210.88
461	-.001	199.06	508	-1.04	214.58	555	.0458	210.93
462	.016	199.08	509	.008	214.59	556	.0247	210.95
463	.006	199.09	510	.047	214.63	557	.0368	210.99
464	-.004	199.08	511	.010	214.65	558	.0099	211
465	.145	199.23	512	-.007	214.64	559	.0533	211.05
466	-.008	199.22	513	.020	214.66	560	.0970	211.15
467	-.15	199.07	514	-.013	214.65	561	.0022	211.15
468	-.05	199.02	515	.380	215.02	562	-.305	210.85
469	.003	199.02	516	-.09	214.93	563	.0244	210.87
470	-.004	199.02	517	.530	215.46	564	.0458	210.95
471	.007	199.03	518	.540	216.00	565	.0611	210.98
472	.006	199.03	519	.170	216.17	566	.0723	211.05
473	.111	199.14	520	-.69	215.48	567	.0394	211.09
474	-.004	199.14	521	.520	215.99	568	.0941	211.18
475	-.04	199.10	522	-.47	215.52	569	.2563	211.44
476	-.02	199.08	523	.0006	215.52	570	.136	211.58
477	.082	199.16	524	-.21	215.31	571	-4.135	207.44
478	.006	199.17	525	-1.22	214.10	572	.0385	207.48
479	.012	199.18	526	.0002	214.10	573	3.0685	210.55
480	.010	199.19	527	.36	214.46	574	.0081	210.56
481	2.41	201.60	528	.35	214.80	575	.7491	211.31
482	12.78	214.38	529	-.003	214.80	576	.020	211.33
483	2.86	217.24	530	-.004	214.80	577	.009	211.33
484	-.013	217.23	531	.076	214.87	578	-.709	210.62
485	3.42	220.65	532	.323	215.20	579	.0123	210.64
486	-3.27	217.37	533	.048	215.25	580	-.0308	210.61
487	.681	218.06	534	.019	215.26	581	-.0415	210.56
488	-.004	218.06	535	.04	215.30	582	3.892	214.46
489	0	218.06	536	-1.72	213.58	583	-3.524	210.93
490	-.007	218.05	537	.005	213.59	584	.7249	211.66

Appendix J cont.

TS	DMR	CDR	TS	DMR	CDR	TS	DMR	CDR
491	1.04	219.09	538	.0003	213.59	585	.3067	211.96
492	-.007	219.08	539	.0003	213.59	586	.5249	212.49
493	-.005	219.08	540	.013	213.60	587	.169	212.66
494	.676	219.75	541	.717	214.32	588	0	212.66
495	.004	219.76	542	-.01	214.31	589	.125	212.78
496	-.0005	219.8	543	.008	214.32	590	-.1866	212.60
497	.003	219.76	544	-.44	213.87	591	-.0014	212.60
498	.001	219.76	545	-.05	213.82	592	.0518	212.65
499	.013	219.77	546	.046	213.87	593	.283	212.93
500	-.0062	219.77	547	-1.45	212.42	594	-.0013	212.93
501	-.02	219.74	548	-.79	211.62			
502	.002	219.75	549	-.76	210.86			
503	.013	219.76	550	-.003	210.86			

TS = trading session; DMR = daily market returns; CDR = cumulative daily market returns

Appendix K: Weekly market returns of the GSE 1993-1995 (see Figure 1)

TS	WMR	CWR	TS	WMR	CWR	TS	WMR	CWR
216	8.94	8.94	308	1.37	87.36	424	.719	179.70
218	8.76	17.70	310	.22	87.58	427	.885	180.59
220	10.68	28.38	312	1.58	89.13	430	-.17	180.41
222	3.26	31.64	314	.119	89.25	433	.73	181.14
224	3.50	35.13	316	3.69	92.95	436	-.04	181.11
226	3.38	38.51	318	1.84	94.79	439	-.004	181.10
228	-5.51	33.005	320	.445	95.23	442	.012	181.11
230	-5.24	27.77	322	.536	95.77	445	1.67	182.78
232	-2.03	25.73	324	1.01	96.78	448	.008	182.79
234	2.22	27.96	326	.62	97.40	451	.754	183.54
236	7.21	35.17	328	11.07	108.47	454	.64	184.18
238	.291	35.46	330	11.67	120.14	457	.006	184.19
240	-.64	34.82	332	9.07	129.21	460	-.02	184.17
242	.602	35.42	334	10.57	139.79	463	.022	184.19
244	-.67	34.75	336	11.01	150.80	466	.133	184.32
246	.875	35.63	338	9.12	159.92	469	-.20	184.13
248	1.13	36.75	340	9.06	168.98	472	.012	184.14
250	1.07	37.82	342	7.33	176.31	475	.068	184.21
252	.784	38.61	344	3.41	179.72	478	.067	184.28
254	.208	38.82	346	1.4	181.12	481	2.43	186.71
256	.291	39.11	348	3.86	184.98	484	16.06	202.77
258	2.20	41.31	350	-.27	184.71	487	.69	203.47
260	1.76	43.07	352	-3.45	181.26	490	-.01	203.46
262	.154	43.22	355	.106	181.37	493	1.03	204.48
264	-.62	42.60	358	-.35	181.01	496	.679	205.16
266	2.09	44.69	361	-.47	180.55	499	.016	205.18
268	1.18	45.87	364	-3.05	177.50	502	-.02	205.15
270	2.81	48.68	367	-.11	177.39	505	.042	205.19
272	3.86	52.54	370	-2.93	174.46	508	-5.14	200.06
274	3.71	56.25	373	-.83	173.63	511	.064	200.12
276	-.096	56.15	376	.209	173.84	514	-.0004	200.12
278	.269	56.42	379	-.27	173.56	517	.811	200.93
280	.341	56.76	382	-.13	173.43	520	.017	200.95
282	1.21	57.97	385	-.12	173.31	523	.042	200.99
284	.435	58.41	388	.152	173.46	526	-1.42	199.57
286	2.27	60.68	391	.106	173.56	529	.709	200.28

Appendix K cont.

TS	WMR	CWR	TS	WMR	CWR	TS	WMR	CWR
288	2.70	63.38	394	-1.77	171.80	532	.403	200.68
290	2.11	65.48	397	-.82	170.97	535	.012	200.70
292	.253	65.74	400	-1.71	169.27	538	-1.72	198.97
294	2.41	68.14	403	.046	169.31	541	.73	199.70
296	.620	68.76	406	6.39	175.71	544	-.44	199.26
298	6.04	74.81	409	1.81	177.52	547	-1.46	197.80
300	1.15	75.96	412	1.12	178.64	550	-1.55	196.25
302	1.28	77.25	415	.10	178.74	553	.037	196.29
304	.662	77.91	418	.14	178.88	556	.09	196.38
306	8.08	85.98	421	.102	178.98	559	.102	196.48
562	-.20	196.28	574	3.11	195.93	586	1.569	197.47
565	.108	196.39	577	.779	196.70	589	.295	197.77
568	.21	196.60	580	-.72	195.98	592	-.137	197.63
571	-3.79	192.81	583	-.078	195.91	594	.282	197.91

TS = trading session; WMR = weekly market returns; CWR = cumulative weekly market returns

Appendix L: Comparison of UK and Ghana interest rates (91-day treasury bill rates)

Date	Ghana rates	UK rates	Date	Ghana rates	UK rates
23/05/94	27	4.875	13/03/95	33	6.4375
30/05/94	27	4.875	20/03/95	33	6.25
06/06/94	27	4.875	27/03/95	33	6.3125
13/06/94	27	4.9375	03/04/95	33	6.3125
20/06/94	27	4.90625	10/04/95	33	6.50
27/06/94	27	4.96875	17/04/95	33	6.50
04/07/94	27	4.96875	24/04/95	33	6.625
11/07/94	27	4.96875	01/05/95	33	6.625
18/07/94	27	5	08/05/95	33	6.3125
25/07/94	27	5	15/05/95	33	6.5625
01/08/94	27	5.25	22/05/95	33	6.25
08/08/94	27	5.50	29/05/95	33	6.25
15/08/94	27.15	5.4375	05/06/95	33	6.3125
22/08/94	27.15	5.4375	12/06/95	33	6.375
29/08/94	27.15	5.3125	19/06/95	33	6.375
05/09/94	27.15	5.4375	26/06/95	33	6.375
12/09/94	27.15	5.625	03/07/95	33	6.375
19/09/94	27.15	5.75	10/07/95	33	6.6875
26/09/94	29	5.75	17/07/95	33	6.625
03/10/94	29	5.34375	24/07/95	33	6.3125
10/10/94	28.99	5.75	31/07/95	33	6.59375
17/10/94	28.99	5.50	07/08/95	33	6.625
24/10/94	28.99	5.75	14/08/95	33	6.65625
31/10/94	28.99	5.875	21/08/95	33	6.59375
07/11/94	29.10	5.9375	28/08/95	33	6.59375
14/11/94	29.46	5.875	04/09/95	33	6.59375
21/11/94	29.48	5.8125	11/09/95	40.39	6.53125
28/11/94	29.50	5.8125	18/09/95	40.50	6.5625
05/12/94	29.50	6	25/09/95	40.50	6.5625
12/12/94	29.49	6.0625	02/10/95	40.50	6.59375
19/12/94	29.50	6.0625	09/10/95	40.50	6.625
26/12/94	29.50	6.125	16/10/95	40.50	6.625
02/01/95	29.50	6.25	23/10/95	40.50	6.59375
09/01/95	29.50	6.125	30/10/95	40.50	6.5625
16/01/95	33	6.0625	06/11/95	40.50	6.5625
23/01/95	33	6.25	13/11/95	40.50	6.53125
30/01/95	33	6.25	20/11/95	40.50	6.50
06/02/95	33	6.50	27/11/95	40.50	6.34375
13/02/95	33	6.50	04/12/95	40.50	6.375
20/02/95	33	6.50	11/12/95	40.50	6.3125
27/02/94	33	6.50	18/12/95	40.50	6.28125
06/03/94	33	6.4375	25/12/95	40.50	6.25

TS = trading session; WMR = weekly market returns; CWR = Cumulative weekly market returns

Appendix M: Market capitalization figures used for Figure 4 (billion cedi)

TS	MCap	TS	MCap	TS	MCap	TS	MCap	TS	MCap
247	60.58	293	77.54	339	193.36	385	205.36	431	207.97
248	60.96	294	79.18	340	205.29	386	205.63	432	207.29
249	61.29	295	79.70	341	213.88	387	205.79	433	207.14
250	61.54	296	79.88	342	220.03	388	206.22	434	207.07
251	61.88	297	80.12	343	220.92	389	207.24	435	206.61
252	62.01	298	84.18	344	226.65	390	207.66	436	206.40
253	61.83	299	85.06	345	227.84	391	208.08	437	206.22
254	62.14	300	85.07	346	229.48	392	208.50	438	206.41
255	59.65	301	86.28	347	233.55	393	208.72	439	206.31
256	62.25	302	86.09	348	239.47	394	209.64	440	206.59
257	62.74	303	86.10	349	238.03	395	209.59	441	206.59
258	63.65	304	86.64	350	238.15	396	210.48	442	206.53
259	64.64	305	91.08	351	234.85	397	211.55	443	206.53
260	64.62	306	92.84	352	234.68	398	212.16		
261	64.80	307	94.23	353	226.07	399	214.29		
262	64.69	308	94.04	354	237.37	400	214.65		
263	64.40	309	94.13	355	235.76	401	214.85		
264	64.23	310	94.24	356	235.78	402	214.50		
265	65.09	311	94.13	357	232.87	403	215.48		
266	65.53	312	95.64	358	227.97	404	217.40		
267	65.95	313	95.72	359	224.02	405	215.53		
268	66.19	314	97.03	360	221.33	406	215.59		
269	66.96	315	100.36	361	217.35	407	216.86		
270	67.90	316	100.43	362	218.05	408	216.69		
271	69.20	317	100.86	363	216.11	409	214.84		
272	70.33	318	102.23	364	216.20	410	214.79		
273	72.59	319	102.04	365	211.32	411	214.03		
274	72.90	320	102.67	366	212.02	412	214.73		
275	72.73	321	103.08	367	212.93	413	215.59		
276	72.92	322	103.20	368	215.10	414	215.79		
277	73.12	323	103.61	369	215.36	415	214.93		
278	72.54	324	104.19	370	217.04	416	214.84		
279	73.08	325	104.41	371	217.45	417	214.41		
280	72.77	326	104.80	372	213.49	418	215.09		
281	73.48	327	113.49	373	213.76	419	213.64		
282	73.38	328	116.22	374	212.64	420	213.62		
283	73.08	329	119.92	375	213.12	421	212.67		
284	73.42	330	129.56	376	213.82	422	212.73		
285	74.36	331	133.12	377	213.90	423	213.45		
286	75.02	332	141.17	378	213.64	424	213.29		

Appendix M cont.

287	76.67	333	148.42	379	208.91	425	213.26
288	76.18	334	155.74	380	207.26	426	212.28
289	76.87	335	164.65	381	206.80	427	212.07
290	77.78	336	172.83	382	206.24	428	209.63
291	77.35	337	181.01	383	206.35	429	208.82
292	77.47	338	188.48	384	206.14	430	208.28

TS = trading session, MCap = Market capitalization

Appendix N: Value traded figures used for Figure 5 (million cedis)

TS	ValT	TS	ValT	TS	ValT	TS	ValT	TS	ValT
247	1.31	293	15.75	339	26.50	385	23.72	431	9.804
248	4.61	294	12.06	340	21.43	386	9.090	432	432.5
249	4.73	295	7.378	341	42.76	387	11.49	433	1.695
250	0.472	296	7.819	342	1173	388	7.480	434	6.549
251	1.761	297	11.98	343	426.0	389	50.75	435	26.76
252	4.292	298	79.11	344	1945	390	135.2	436	1.271
253	2.895	299	5.869	345	56.39	391	334.5	437	314.6
254	3.339	300	4.622	346	85.11	392	7.805	438	451.1
255	3.684	301	2.042	347	328.6	393	5.512	439	662.6
256	4.076	302	2.257	348	146.9	394	303.3	440	199.1
257	5.225	303	1.959	349	41.30	395	7.766	441	609.4
258	2.750	304	1.413	350	314.9	396	46.77	442	2.355
259	25.26	305	3.469	351	72.22	397	36.66	443	138.3
260	1.870	306	5.942	352	54.51	398	7.705		
261	2.035	307	9.838	353	16.23	399	166.7		
262	1.172	308	1.765	354	8.987	400	11.87		
263	1.927	309	3.849	355	8.634	401	5.105		
264	4.196	310	2.412	356	6.167	402	19.41		
265	8.367	311	5.051	357	3.438	403	6.089		
266	4.911	312	81.43	358	2.559	404	543.9		
267	2.588	313	2.407	359	22.74	405	8.509		
268	3.961	314	24.53	360	3.113	406	5.078		
269	3.688	315	9.840	361	33.12	407	882.2		
270	9.350	316	4.826	362	98.54	408	203.6		
271	7.335	317	3.975	363	4.336	409	78.53		
272	1.921	318	3.173	364	5.779	410	2.639		
273	1.312	319	3.937	365	164.4	411	12.98		
274	4.037	320	8.070	366	30.89	412	1193		
275	13.35	321	5.155	367	128.3	413	8.737		
276	6.729	322	2.814	368	26.56	414	258.7		
277	231.8	323	374.0	369	61.11	415	2.857		
278	7.193	324	380.1	370	55.79	416	16.49		
279	13.19	325	44.71	371	19.08	417	35.96		
280	14.76	326	8.005	372	34.95	418	43.10		
281	16.14	327	22887	373	25.90	419	5.489		
282	11.32	328	14.47	374	12.61	420	7.720		
283	13.18	329	14.06	375	115.3	421	5.625		
284	11.70	330	12.20	376	18.28	422	240.4		
285	16.70	331	13.23	377	9.887	423	9.402		
286	7.948	332	9.571	378	6.633	424	25.04		

Appendix N cont.

287	3.559	333	27.74	379	7.367	425	1.859
288	3.172	334	21.15	380	1.974	426	14.73
289	18.47	335	11.17	381	7.852	427	34.84
290	3.940	336	17.72	382	71.41	428	4.497
291	8.919	337	15.82	383	18.10	429	21.40
292	3.126	338	403.4	384	36.35	430	25.39

TS = trading session, Val T = value traded

Appendix O: Market capitalization/GDP ratios without AGC

Year-end	Market capitalization (¢billions)	GDP (¢billions)	MC/GDP
1991	29.62	2574.8	0.011503806
1992	43.75	3008.8	0.01454068
1993	95.72	3932.4	0.024341369
1994	206.53	5061.0	0.040808

Source: Ghana Stock Exchange; GDP figures from the International Financial Statistics.

Note: The GDP figure for 1994 is an estimate based on provisional estimates of real GDP growth of 3.8% and inflation rate of 24.9% as announced in the 1994 budget statement.

Appendix P: Value traded/GDP ratios without AGC

Year	Value of shares (¢billions)	GDP (¢billions)	Value/GDP
1991	.10469310	2574.8	.000041
1992	.17342720	3008.8	.000058
1993	3.17793449	3932.4	.000808
1994	37.86831549	5061.0	.007482

Source: Ghana Stock Exchange; GDP figures from the International Financial Statistics.